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Tracing the social project of Networked Learning

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Abstract

This paper provides an outline of Networked Learning as a social project. Using a theoretical framework derived from activity theory, the paper reconstructs the existing narratives in key texts on a principled basis and traces the project through three phases whose core concepts, in turn, are educational openness, connections between network elements, and connections for particular purposes. Against the backdrop of an ongoing discussion of the meaning and nature of Networked Learning, the aim is to show how concepts of networked learning respond to social predicaments and are used as the basis for institution building, and to illustrate the kind of dynamics that have led to change in the past—as a potential guide to addressing upcoming challenges.

Keywords

activity theory, concepts, research community, social project.

Introduction

There is an ongoing discussion about the nature and meaning of Networked Learning (NL). The Networked Learning Editorial Collective, for example, note that the Covid-19 pandemic has accentuated the need to distinguish between different visions of future education; offering, as a resource for doing so, a new definition of Networked Learning (NLEC, 2021) which has attracted significant commentary (e.g., NLEC et al., 2021). As scholars of expansive learning have documented (Bligh & Flood, 2017), efforts to reconceptualise and expand fields of enquiry are often strengthened by examining the historical trajectory that has led to the present moment. This paper aims to contribute a distinct historical analysis for that purpose. The paper briefly outlines an analysis of NL as a social project, where 'social project' is taken to mean an ongoing range of actions, within a wider social formation, oriented around a developing concept. The aim is to understand NL as a dynamic, unfolding social construct with its own priorities and logic of development. The analysis deliberately foregrounds previous and ongoing attempts to define and contest NL's central concept. We notice how such attempts, which build on a prior history of development and engagement with other projects and which serve to foreground the subjectivity of different kinds of people, respond to the predicaments being posed at different times in the wider social formation.

Scholarly discussions about aspects of NL have been occurring for many years. Contributions, for example, have debated whether it is a theory, practice or pedagogy (Hodgson, McConnell & Dirckinck-Holmfeld, 2010); explored its relations to other scholarship on 'networks' (Goodyear & Carvalho, 2014); emphasised its distinctiveness from alternatives like 'e-learning' (Jones, 2015); and traced the associated theories, methods and educational sites of research (de Laat & Ryberg, 2018). The distinctiveness of the present work arises from an underlying conceptualisation of Network Learning as an unfolding succession of actions—particular people pursuing concrete goals via the use of tools—whose motivation and meaning arise from their position in a wider formation. Following recent discussion in activity theory, discussed further below, we characterise that wider formation as a 'social project'. Prior works have focussed on NL as a concept (Dohn et al., 2018; Öztok, 2020) or community (Hodgson & McConnell, 2018) in ways that emphasise continuity and essence, while others have provided historical overviews (Goodyear, 2014) or research syntheses (de Laat & Ryberg, 2018) that document considerable change without proffering an explanatory principle for that change. By analysing NL as a social project, we hope to highlight an unfolding dynamism, thereby shedding light on contested concepts and practices and the logic of their reciprocal change and development over time.

In what follows, we provide a condensed overview of three key phases of conceptual innovation or contestation in the social project of Networked Learning. We analyse the context, contours of practice and dilemmas confronted by the social project at those phases. Firstly, however, we describe how the account was produced, placing a particular emphasis on our theoretical framework.

Analysing Networked Learning as a 'social project'

Our approach to this task involved a critical reading of selected Networked Learning texts, whose arguments were disaggregated and reassembled using a definite framework. To begin with, we consulted several key texts from the Networked Learning corpus: looking especially for papers which focus on defining the concept of Networked Learning, whether by putting forward a definition or offering a related critique. We also sought texts that provide a historical perspective. By examining texts with these three characters (definition, critique, historical overview) we hoped to construct a narrative attentive to change and development in conceptions over time. Starting from those initial texts, we used a snowball strategy to follow up appropriate further references. We were aware that this approach carried the risk of partial coverage, but we wished to focus on an emergent, critical analysis of key texts rather than systematic analysis.

The framework we used was that of the 'social project', which we derive from the activity theory tradition and especially the work of Blunden (2010; 2014; 2019). Activity theory is a mature theory with a strong emphasis on understanding how human relationships are influenced by technology (Kaptelinin & Nardi, 2018). It has also been used extensively to study educational practices, with researchers valuing its grasp of sociocultural context, complexity and dynamics, and change and development (Bligh & Flood, 2017). Blunden's work reinterprets activity theory through a Hegelian-Marxist lens, for the purpose of reinvigorating it as a social theory that can support interdisciplinary debate about institutions and social formations (Blunden, 2010).

From a reading of Blunden's œuvre, we can understand a 'social project' as an "on-going, interconnected aggregate of actions" (2010, p. 256), whose implicit aims participants attempt to infer into a concept (2019, p. 45). The term actions, within activity theory, means people pursuing concrete goals in a time-bound way (Leontyev, 1977/2009). Actions derive meaning from their wider context: being enacted in social projects oriented around concepts. Social projects exist at very different scales: Blunden's examples include 'fundraising initiatives', 'Christianity', and 'activity theory' (cf. 2010, p. 257), with the latter an academic project closest to our own starting point in this paper. For present purposes we frame social projects as having seven core characteristics, which we summarise below in a necessarily abbreviated way. An expanded summary of the underlying notions is provided by Blunden (2014), while an earlier version of this framework is used by Bligh (2021) to analyse a different social project (one based around the OECD concept of 'Innovative Learning Environments'). The seven characteristics we focus on are as follows:

- *Predicaments*: constraints on the freedom of some people within a given social structure, taken as motivating the pursuit of the social project at a given stage;
- *Subjects*: people, driven to emancipate themselves from their predicaments, who come together to transform social life;
- *Concept*: the underlying purpose the social project is attempting to realise—its grounding principle;
- *Ethos*: the set of ethics mediating between the social project's concept and the actions undertaken, whose purpose is to regulate 'correct' conduct;
- *Sedimented artefacts*: those artefacts which 'objectify' particular aspects of the concept and/or ethos and which are used within the project to pursue action;
- *Engagement with institutions*: relations with other social projects (taken as 'institutions' from the vantage point of this social project), via which subjects seek to 'project' their concept into the social formation;
- *Lived experience*: subjects' encounters and confrontations with crises as the social project is enacted.

This framework aims to provide a concise basis for a dynamic view of social projects as they change and pass through stages of development. Predicaments impel some people to take action, becoming subjects as they differentiate themselves in the social formation. Subjects generate concepts which orient—however inadequately—their pursuit of emancipation. In pursuing the concept, an ethos is constructed and artefacts sedimented into the project that help disaggregate work into discrete actions. As subjects take action to 'project' (a verb) their concept through other institutions, into the wider social formation, they generate a succession of crises that expose to them the project's inadequacies. Those crises lead them to reframe the predicaments and concept, remediate the ethos and artefacts, recruit more subjects (and/or suffer personnel losses), and/or abandon

the project. Social projects with sufficient success and longevity pass through 'institutionalising' phases of development, thereby taking their place alongside the other institutions that comprise the wider social formation. We attempt to retain this sense of ongoing dynamics in the account we present below, notwithstanding that concision compels us to 'focus in' on particular moments in the development of Networked Learning.

Overview

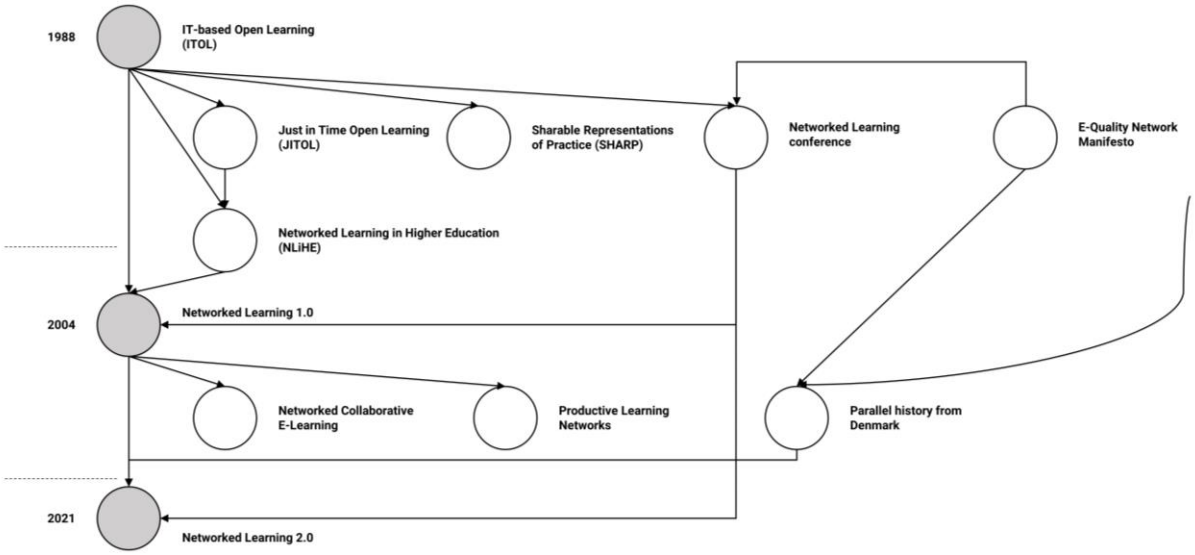

Figure 1: Schematic overview of the phases of the social movement and key actions

Our source texts present NL as a series of definitions, concrete research projects (some of which have a particularly 'canonical' status) and historical trajectories. We provide a schematic overview of the most prominent aspects of these narratives in Figure 1, with circles representing actions influential within the history of the project. We demarcate three distinct phases of development for the project, based on changes in the central concept, wose approximate boundaries are represented by horizontal dotted lines. Those phases are concerned, respectively, with educational openness; connections 'between' particular elements; and connections 'for' particular purposes. We analyse what it means for NL to constitute a social project oriented towards each of these concepts, in turn, below.

A social project for 'educational openness'

The first phase of the social project we consider is oriented around the concept of 'educational openness'. That concept is associated with the IT-based Open Learning (ITOL) project and its successors, which many source accounts locate at the origin of Networked Learning in the late 1980s (McConnell et al., 2012; Goodyear, 2014). Figure 2 provides a graphical overview of the social project at this stage of development, and introduces a format that we shall reprise again in subsequent sections: a set of social predicaments leads some people to express a specific kind of subjectivity; their conception of the problem is expressed in an ethos and through a set of gradually sedimenting artefacts; and their attempts to engage with other institutions leads to a lived experience of dilemmas and crises that motivate them to develop and change the project.

The *predicaments* that framed the ITOL work arose from confronting a set of ardent claims for ICT in higher education which seemed belied by the reality of the existing technological tools. The actual ICTs of the time were, as Goodyear (2014) puts it, "primitive, slow, unreliable and not widely available" (p. 23). Yet pioneers of Open and Distance Learning (ODL) were nonetheless conducting what McConnell et al. (2012) call a series of "experiments and initiatives", to support learning using "innovatory ICTs" (pp. 4-6). Such activities were visible in the UK (McConnell et al., 2012) and the USA (Goodyear, 2014). Given the "frustrating limitations of working with slow, unreliable connections, having to learn obscure sets of commands and managing the constraints of display technologies" (p. 30), such work had a considerable focus on technology itself (i.e., how to get educators and students to learn to use it). There were concerns that such testbed settings failed to provide a sufficiently "rich experience", especially by comparison with familiar face-to-face modes of education, yet it was demonstrated that a variety of tasks and outcomes could be achieved successfully, and many students perceived the possible benefits

of the new technologies (McConnell et al., 2012). Widespread claims that education was on the cusp of being rendered "open" by technology arose from this mixed milieu of atypical testbed settings, specific and somewhat narrowly bounded instances of success and perceptions of future possibility.

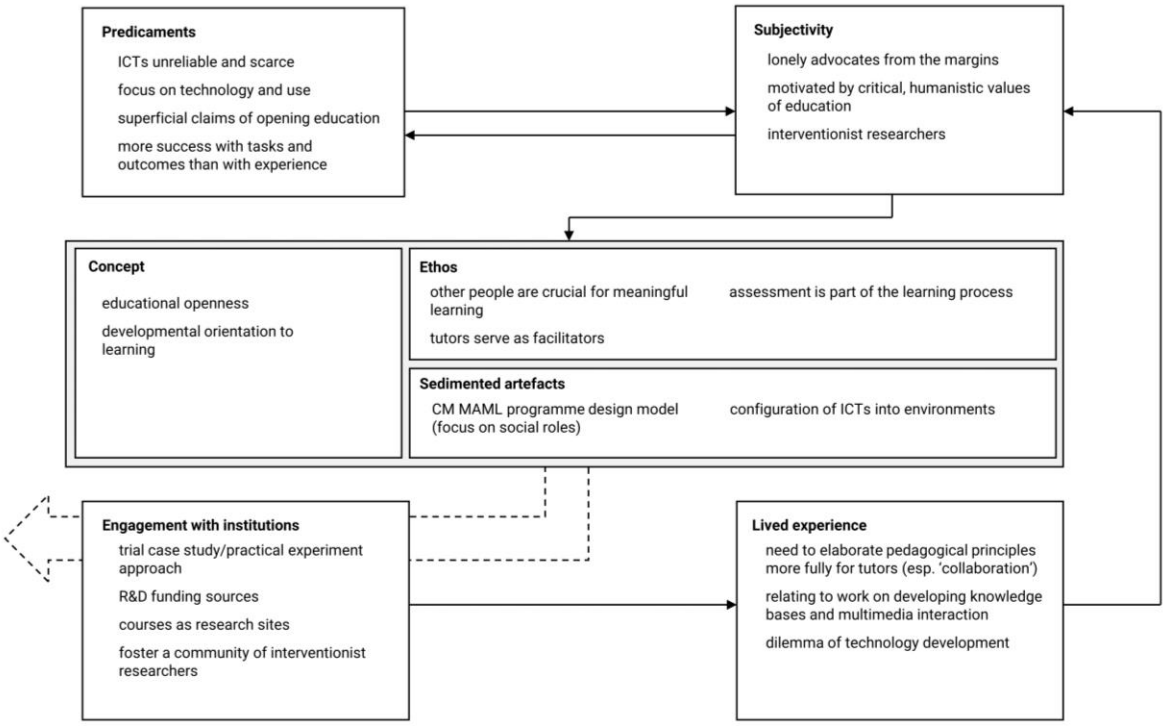

Figure 2: Networked Learning as a social project for educational openness

Such predicaments frame a social project to the extent that they stimulate a specific *subjectivity*, where those experiencing the predicament come to identify themselves as separate from the mainstream and commit to act with a new concept in mind (Blunden, 2019). In this instance, such subjectification arose from critical analysis of the above claims for rendering education "open". Boot and Hodgson (1987), for example, examined contemporary ODL initiatives critically and concluded that, in the main, they offered an orientation based on dissemination that provided an inadequate basis for future openness. They suggested that this merely "administrative openness" should be supplanted by a more "developmental" orientation if the claims of pioneers were to be rendered more meaningful. This was a minority stance, and was taken up by scholars who viewed themselves as "weird and lonely advocates" undertaking "work from the margins" (Goodyear, 2014, p. 34). They believed that that the validity of their views could only be demonstrated by practical demonstration, and thereby adopted what the present authors would call an interventionist stance.

The *concept* pursued by these lonely, interventionist advocates was "educational openness", named in opposition to the aforementioned "administrative openness". McConnell et al. (2012) describe this concept as an attempt to problematise uses of educational technology in ways responsive to "thinking stemming from the traditions of open learning and other radical pedagogies and humanistic educational ideas from the likes of Dewey, Freire, Giroux and Rogers" (p. 4). Educational openness deliberately implied a developmental orientation, in which learners define their own needs for learning and professional development (McConnell et al., 2012, p. 8). The social project thus set out "to optimise and research the growing potential and possibilities of rapid developments in ICT to offer greater degrees of educational openness" (McConnell et al., 2012, p. 6).

This work spawned (seemingly fairly quickly) an *ethos*: attempts to stipulate 'correct' practice. Specific ethics were that "other people [are] an inherent part of the learning venture, providing challenge and collaboration in the construction of personal meaning" (Boot and Hodgson, 1987); that assessment is "part of the learning process, based on collaborative assessment against mutually agreed criteria" (McConnell et al., 2012); and that "the tutor role within a development orientation was one of facilitator" (McConnell et al., 2012), with the implication that "[m]eanings he/she attributes to events [are] no more valid than anyone else's" (Boot and Hodgson, 1987). This ethos deliberately challenged conventional pedagogical power dynamics.

The *artefacts sedimented* into the fabric of the social project at this stage certainly included particular ICTs. Yet the most important artefacts were underpinning models that related different technologies within concrete designs. Both asynchronous and synchronous communication technologies were, in these models, integrated into environments which McConnell et al. (2012) describe as "an early variation of a VLE" (p. 8). As McConnell et al. (2012) assert, "it was not the technology itself that made the [work] more educationally open but the way it was able to contribute to implementing the learning design and processes". One influential model for this "electronic environment" was called "CM MAML". The model, reproduced in McConnell et al. (2012), focusses mainly on framing relations between learning sets, chat and discussion areas, bibliography and library services, shared project working spaces and notice boards (p. 7). As Goodyear (2014) notes, "the ITOL model foregrounded social design – focusing on roles for learner, tutor, counsellor and manager of the resources – and placing the community of learners (rather than tutors or resources) at the center of things. […] Given the high value placed on students' choice of learning goals and methods, the ITOL model was relatively silent about task design" (p. 36).

The work of ITOL and its close successors also developed a particular strategy for *engaging with institutions*. Funding was seen as important, but was obtained from bodies with "R&D" and innovation remits, such as the UK's Training Agency and Joint Information Systems Committee, rather than scholarly research *per se*. Partly as a consequence, the work adopted an approach, which McConnell et al. (2012) call "trial case study" (p. 6) and Goodyear (2014) calls "practical experiments", that sought to bind together theoretical advance with the practical development of courses relevant to strategic funding remits, such as a Masters programme at Lancaster University. A sequence of such practical experiments was conducted, which, as McConnell et al. report, "helped create a community of researchers, albeit mainly within Europe, who were interested in networked, vocationally-oriented collaborative learning for adults" (p. 35).

In terms of *lived experience*, central dilemmas concerned how to guide practice (and, therefore, practitioners) in ways consonant with the project's concept and ethos. One response was the ongoing development of new models, a key example being McConnell's design for pedagogy and process developed around 1994 (McConnell et al., 2012). These new models sought to identify and address oversights highlighted by experience, such as the centrality of 'collaboration' to the developmental orientation of educational openness. Conversely, several projects (see Figure 1) explored new possibilities of incorporating novel media. The JITOL project, for example, focussed on knowledge sharing tools, while the SHARP project explored non-textual, multimedia interaction (Goodyear, 2014, pp. 36-37). The issue of exploring the opportunities arising from new media has remained core to the social project, but attendant attempts at developing new technologies have not remained so prominent. While such development was understandable—as Goodyear (2014) notes, "SHARP preceded YouTube just as JITOL preceded the World Wide Web" (p. 38)—from the vantage point of the social project's subsequent history it can be regarded as a misconception.

One core outcome of this unfolding social project was the formation of the Networked Learning conference. The conference put forward a particular perspective on the above dilemmas, being "founded in 1998 by David McConnell with the specific purpose of offering an international conference that focused primarily on the educational aspects of learning that is supported by new information technologies, rather than a focus on the technology itself, as was the case with many other conferences at that time" (McConnell et al. (2012, pp. 9-10).

A social project for connection (connection between)

The next phase we consider was oriented around the concept of 'connection'. We emphasise 'connection between' in the section heading to indicate a contrast with a later concept in which purpose (cf. 'connection for') becomes central. This stage of development becomes evident in the source material somewhere around 1998 (the first Networked Learning conference) or 1999 (the start of the particularly crucial Networked Learning in Higher Education [NLinHE] project which was, as McConnell et al. [2012, p. 6] emphasise, initially "based on the original ITOL model"). The present exposition and graphical representation (Figure 3) is deliberately structured to allow comparison with the preceding section.

Prominent *predicaments* confronting this stage of development were partly concerned with what Jones and Steeples (2002) frame as two 'convergences': between digital computing and telecommunications; and between distance learning and more conventional HE provision. With regard to the former, Jones and Steeples argue that "the emergence and growth of the Web in the 1990s has had a profound impact, making networks the center and focus of developments in the way in which computers themselves had provided a focus previously" (p. 1). Both

convergences, in turn, were often positioned as part of a wider rhetoric about how the networked society would enable the "breaking down of barriers" (p. 2). Such barrier-breaking was seen as both opportunity and challenge for society, and as placing particular demands on education systems (Jones & Steeples, 2002, p. 3; Jones, 2015, Ch. 2). Dominant research emphasised 'learners' (individuals) gaining 'access' to rich 'resources' via technology networks seen as global and undifferentiated (Goodyear & Carvalho, 2014, pp. 12-13).

The *subjectivity* stimulated by these predicaments was driven by a sense that dominant discussion obscured the nature and reality of networks thesmelves. Goodyear and Carvalho (2014), for example, reinforce how a focus on individuals and resources makes unwarranted assumptions about how networks operate across different scales (such as the institutional or the global) (pp. 12-13). As for the previous stage of development, therefore, this sense of subjectivity involves an outsider challenge to mainstream conceptions. Yet by this stage the preceding history had brought together groups of "practitioners already involved in networked learning" (Jones & Steeples, 2002, p. 6; McConnell et al., 2012). Furthermore, these people came together to challenge these concepts practically, by demonstrating the utility of alternative concepts, not merely rhetorically. It is noteworthy that the source texts emphasise this historically aggregating group (or community) without much reference to the motivations of those joining later. The main sense in the texts is of continuity and building on earlier project infrastructures. The formation of the NLinHE funded project, for example, had as its main aim to extend existing work "to help the UK HE sector come to a better understanding of the potential and problems of networked learning, particularly by attending to the student experience and to learning and teaching issues" (Goodyear et al., 2000, p. 3).

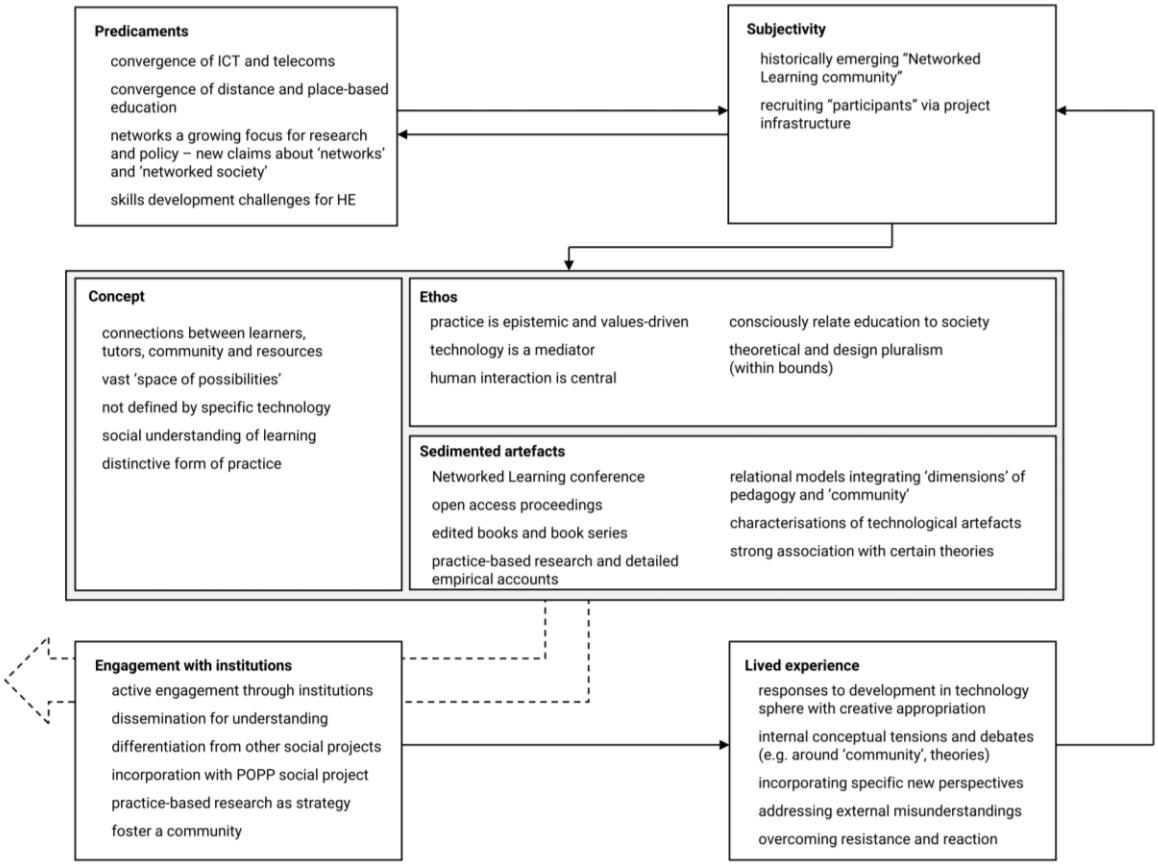

Figure 3: Networked Learning as a social movement for connection 'between'

The *concept* orienting the project at this stage is expressed in a widely cited definition arising from the NLinHE work (c.f., Goodyear et al., 2000, p. 5). The concept is one of connections (Jones, 2015); specifically, as the definition famously states, "between one learner and other learners, between learners and tutors; between a learning community and its learning resources" (Goodyear et al., 2000, p. 5). The concept acknowledges the role of technology in promoting connections, but does not position it as primary; it is the interactions supported by connections, rather than technologies *per se*, that are seen as promising a vast "space of possibilities". Jones and Steeples (2002), writing in the book where the definition was first published widely, argue that the definition

"points towards a social understanding of learning", where 'network' labels "the way in which different aspects of the process were linked together" (p. 2). The concept appears, therefore, as a development of the earlier concept ("educational openness") which uses 'network' to takes a more explicit stance on what were previously thought of as 'configuration' issues. The concept, moreover, was meant to support action in creating a "distinctive version" of mainstream approaches (then labelled "e-learning") (Goodyear et al., 2004, p.1).

The *ethos* regulating 'correct' practice stipulates explicit commitments to values and theory. Practice is viewed as epistemic, in the sense of being guided by knowledge and also producing it; 'correct' practice should address societal challenges, especially concerned with the nature of society and how learners might contribute to it (Hodgson et al., 2012, p. 293). Technology, meanwhile, is viewed as a mediator sitting within connections. How this 'mediation' is conceived is not uniform within the project, and indeed it is another ethic that there is no one single canonical 'learning theory' for the social project (Jones, 2015). But there is a commitment that technology "does not and cannot determine learning, learning design or the learning process" (Hodgson et al., 2012, p. 293; also Jones & Steeples, 2002 pp. 4-5). Instead, human interaction is central. As Goodyear et al. (2004) state: "The centrality of human interaction, in our conception of networked learning, carries with it some pedagogical commitments and beliefs about learning. In short, there is no point to networked learning if you do not value learning through co-operation, collaboration, dialog, and/or participation in a community" (p. 2).

A wide range of *artefacts* are *sedimented* into the project throughout this stage. The project establishes a core conference, whose aim is "to bring networked learning research and praxis together" (de Laat and Ryberg, 2018, pp. 3-4). That conference makes a specific point of publishing online, open-access proceedings. Furthermore, a range of edited books eventually incorporated into a specific series, is established; these are viewed both as academic outputs, whose process of production accentuates "relationships and common understandings" within the project (Goodyear et al., 2004), and as a means of "dialog between the needs of higher education staff […] and the research community" (Jones & Steeples, 2002, p. 8). In a clear point of continuity with the prior history, these artefacts serve to convey (a) practice-based research and detailed accounts, which, as Levy (2004) notes, convey methodologically the politics and purposes of the project, and (b) "relational models" which aim to support design initiative in various ways (Hodgson et al., 2012, p. 303). As noted above, it is part of the ethos of the project that no specific learning theory is prescribed (and, indeed, regular debates are ongoing that mirror the theoretical 'canon disputes' described by Bligh [2020]). Yet, as de Laat and Ryberg's analysis (2018) concludes, "it seems clear that networked learning is strongly associated with theories [plural] that emphasise social, relational and cultural aspects of learning, be they ANT, activity theory, communities of practice, socio-material, social constructionist or constructivist perspectives" (pp. 17-18).

The project seeks actively to *engage through* (established) *institutions*, primarily universities and other organisations within the HE sector. Jones (2015), for example, discusses how NL recognises that "[i]nstitutions are sites for action in which people acting collectively and recursively can alter the conditions in which they find themselves" (p. 131); Jones argues that this view differentiates it from those research traditions that view networks as "personal and de-institutionalised" (p. 132). The NLinHE project explicitly adopted a strategy of "dissemination for understanding", which involved workshops, conferences, seminar series, and producing a free, online, book-length resource for staff development (Goodyear et al., 2000, p. 3). Another mode of engaging with institutions has involved rhetorically positioning NL as separate from other social projects such as e-learning and CSCL (Steeples et al., 2004, p. 323; Jones, 2015, Ch. 1; de Laat & Ryberg, 2018, p. 6). Steeples et al. (2004), for example, disparage "e-learning" as a pragmatic project of quick-fixes and the translation of existing courses online (p. 323). Yet the project has also formed collaborative relations with other movements; in a particularly notable instance actually merging with another project of networked learning from Denmark and subsequently seeking to discover a "parallel history" based on project-based learning (McConnell et al., 2012). Throughout, practice-based research has remained a core strategy of the project (elaborately advocated by Levy, 2004), with the sedimented artefacts and institutional engagement strategies of the project serving as vehicles for further recruitment of subjects.

With regard to *lived experience*, one central dilemma has been how to respond to technological developments, such as the WWW and Web2.0, which have not been developed with the concept and ethos of this project in mind. That problem has been accentuated since the project, by this stage, seems settled against any focus on technology development—leaving it as a 'taker' of technology artefacts used by institutions and throughout wider society. McConnell et al. (2012) paint a picture of creative appropriation built on seeing networks as a useful metaphor rather than a fixed reality. On this view, the emergence of new technologies does not "cause" NL practices to be enacted or abandoned; but, instead, sets ongoing challenges of how to critically engage with what are often fairly mainstreamed technologies (p. 15). In parallel with the discussion about engagement with other scholarly projects,

above, there has been a history of internalising conceptual tensions (e.g., debates on 'community' in Hodgson et al. [2012, p. 297] or 'collaboration' in Jones [2015]) and the incorporation of new perspectives, such as those on problem-based learning from the Danish social project. There has also been a necessity for dealing with encounters with practice situations in which entrenched values and expectations challenge the values of the social project. In some cases, the issue is one of addressing misunderstandings (such as determinism about technology or networks), but in other it is a matter of competing ethoi—for example, where students state a preference for instructional teaching or assessment regulations in a given organisation are closed or restrictive (Hodgson et al., 2012, p. 298).

A social project for purposive connection (connection for)

The most recent phase of development we consider is oriented around the concept of 'purposive connection', i.e., one in which the purpose and character of network connections is viewed as paramount. This is an emerging phase of development and (as a reviewer reminded us) is far from uncontested. Yet the Networked Learning Editorial Collective (NLEC, 2021) has suggested that the present conjuncture requires redefining (reconceptualising?) Networked Learning, and their suggestions for doing so have attracted significant commentary and response (e.g., NLEC et al., 2021). We explore the potential implications below, once again using a format (e.g., Figure 4) deliberately structured to allow comparison with the preceding analysis.

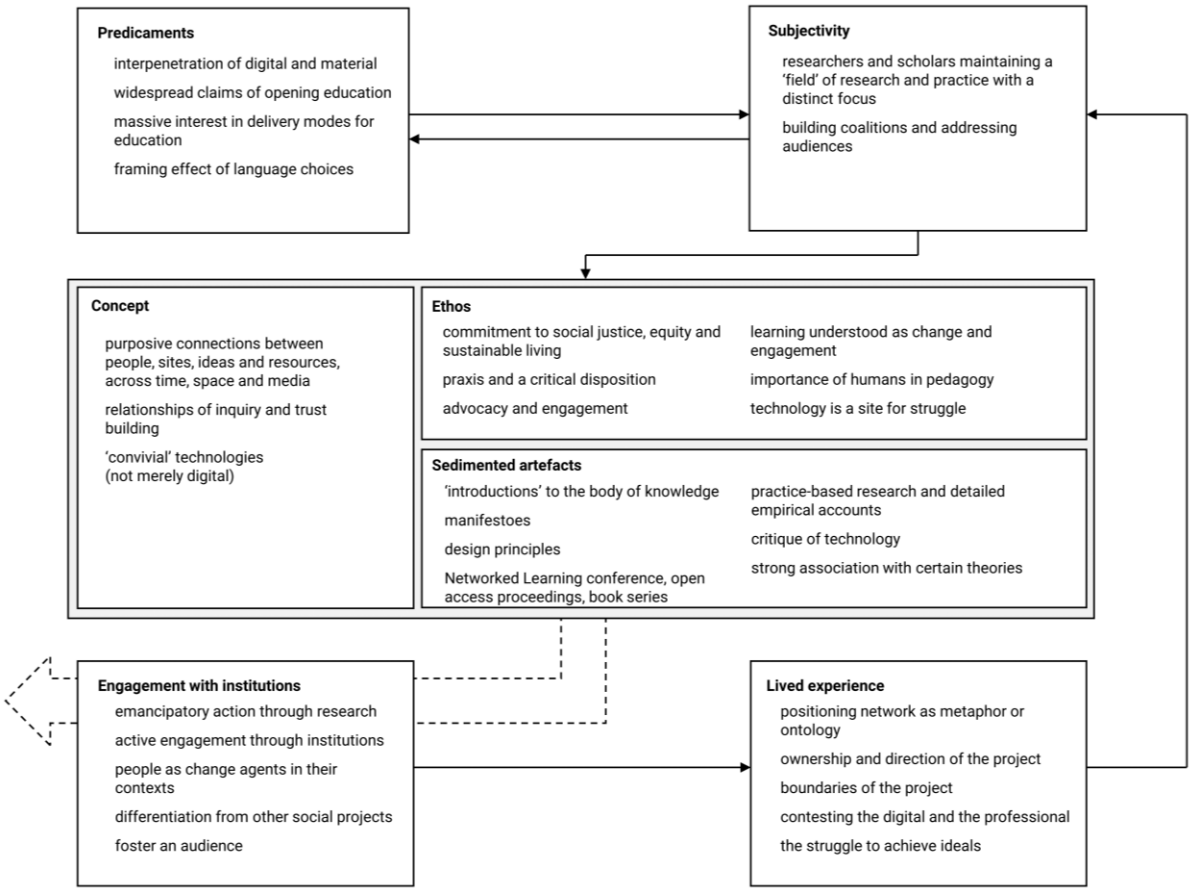

Figure 4: Networked Learning as a social movement for connection 'for'

The *predicaments* discussed at present seem, at first glance, to be straightforward 'successors' to earlier ones. For example, there is an ongoing interpenetration of digital and material that echoes the earlier 'convergences'. As NLEC (2021) put it, "spaces have become hybrid and digital infrastructures are taken for granted […] It is now rare to find real learning situations that can be described as 'purely face-to-face' or 'wholly online'. Rather, they involve complex entanglements of students, teachers, ideas, tasks, activities, tools, artefacts, places and spaces" (p. 313). There are also, as in the 1980s, rambunctious claims to be opening education (discussed in relation to MOOCs by de Laat & Ryberg, 2018, p. 18); and a widespread interest in education delivery modes, whether because of an increased emphasis on 'place' and 'mobility' (de Laat & Ryberg (2018, p. 18) or the Covid-19 pandemic (NLEC, 2021). Contrary to those earlier eras, however. technology is now more widely—albeit not

universally—available, and NL itself has a more established character. Thus NLEC (2012) position the key challenges in terms of language contestation, especially in institutions: "As universities plan their ways forward, *how* they describe past, current and future arrangements may have significant consequences" (p. 313, emphasis in original).

The sense of *subjectivity* in response to these predicaments, however, is remarkably muted. NLEC's new definition seems aimed more at researchers—it "to be used" in systematic reviews and calls for contributions (NLEC, 2021, p. 319)—and less at practitioners, who might be "alert" to it (*ibid.*). Jones' (2015) alternative reflection more explicitly addresses a differentiated set of "audiences", including designers, para-academics and policymakers (p. 4), but how these people might act *through* the project is not explored (the word 'audiences' is telling). Who is to own and enact the project, rather than receive its knowledge, seems underspecified overall.

As for the previous phase, the project expresses its *concept* as a definition whose central axis is 'purposive connection'. NLEC (2021) state explicit aims: that networked learning's "roots in critical and emancipatory educational traditions" (p. 314) will be re-centred, that the connections comprising the networks will be recognised as *not* neutral, and that the concept will address society rather than merely formal education (p. 316). Other constructs used to concretise the concept are those of inquiry (an object for being purposive?) and trust (a prerequisite). The concept responds to the interpenetration of digital and material, positioned above as a predicament, by appropriating Illich's notion of 'tools for conviviality', by which is meant artefacts that "lend themselves to creative use by networks of people who are joined in one or more shared social or political projects" (p. 318). Artefacts thus get centred, but defined more widely than 'digital tools'.

The *ethos* of the social project is proudly political: 'correct' practice is that which commits to a critical disposition, positions technology as a site for struggle, and prioritises issues of social justice, equity and sustainable living. The common thread seems to be a conviction that, as Jones (2015) argues, "Networked learning is not about futures determined by technology, nor is it about sudden and inevitable change. Fundamentally, [it is] about choices, and more specifically about choices made in complex historical contexts. Technology itself is a site of struggle" (pp. 235-236). A commitment to praxis (NLEC [2021] "require both inquiry and action", p. 322) is bolstered by calls for advocacy: "there is the matter of advocacy in the broader fields of educational policy and practice. A working description or definition of networked learning cannot do much on its own." (p. 320). A subtle shift from the previous ethos involves viewing 'correct' learning as being about engagement with, and change of, the world, within which new knowledge is produced (p. 321). Points of commonality with work in other traditions, such as 'expansive learning', are acknowledged by NLEC.

In this phase, the range of *artefacts* being sedimented into the project constitutes augmenting rather than supplanting earlier resources. Critical positions on technology will have continuing resonance, as will the construction of design principles, an association with a certain range of theories—and, naturally, the conference, proceedings, and book series. There is an intention to elevate the existing tradition of practice-based research and detailed empirical accounts to the status of "emancipatory" research (discussed below), while what seems more newly emphasised are introductions' to the already-established body of knowledge, presumably as a way of recruiting new researchers to the cause. A particularly strong argument is made for the role of 'manifestos', which, it is suggested, can serve "both to galvanize thinking and discussion (in their creation) and to represent the purposes and values of the field to others" (p. 320).

Mechanisms for *engagement with institutions* are not set out extensively, but a strategy of using research for emancipatory action is foregrounded: NLEC suggest that an "interest in forms of emancipatory action research, underpinned by a commitment to social justice and empowerment, needs to find a place. […] we should situate a revised definition within larger action-oriented projects and/or promote its application in broader educational, social and political movements (Jones 2019)" (NLEC, 2021, p. 317). One core aspiration seems to be to position students and teachers as change agents who can "help transform the character of […] educational institutions" (p. 318). As the responses to the definition make clear, this will continue to differentiate NL from some other social projects (NLEC et al., 2021). Reinforcing the points made above about subjectivity, one core aspiration is to foster both collective development and an 'audience' for the work of the social project; since networked learning should aim to be a "bazaar" not a "cathedral" (Hansen, in NLEC et al., 2021, p. 334). Yet mechanisms for relating subjects to audiences, or recruiting the former from the latter, are so far left unspecified.

The *lived experience* of this new phase of the project has, of course, yet to emerge. Yet the responses published in NLEC et al. (2021) offer pointers to the dilemmas that project members expect (or wish to raise). Some respondents

critique the ownership of the definition (and, by implication, the project) (Bayne) and ask who is excluded (Bali et al.), reflecting our critique, above, about the present vagueness of the project's subjectivity. Others question the naïve view of connections in a world of online performativity where silence may be desired (Gourlay; Scott), and against a backdrop where a "dark side" of networks is becoming increasingly recognised (Cutajar; Lee & Bligh; Knox). Others engage in contesting specific constructs, whether by contrasting networks, connections and ecologies (Bozkurt; Carvalho); questioning the 'merely' metaphorical status of networks (Pischetola & Dirckinck-Holmfeld; Fawns & Ross; Schnaider); or seeking to recover the centrality of the 'digital' (Jones). The struggle to achieve networked learning is highlighted (Lee & Bligh; Knox), as is the ongoing requirement for professionals and professionalism in nurturing that struggle (Koole). Most commonly, there is a concern with the boundaries of the movement (Bayne; Hansen; Lee & Bligh; Thibault; Czerniewicz), with one area of debate about the desirability of expanding those boundaries or, indeed, seeking to purposefully exclude on grounds of ethos.

Concluding comments

In reviewing the collective responses offered in NLEC et al. (2021), Knox highlights the need to understand how the concepts of networked learning might be developed through practice—"by putting NL 'to work'" (p. 359). In this account, we have sought to demonstrate that such a relationship between concept and practice has been developing within a social project for some decades, even if the standard accounts provided within the field do not adequately draw attention to that fact.

Against the backdrop of an ongoing discussion of the meaning and nature of Networked Learning, we have aimed to show how concepts of networked learning have always responded to social predicaments and been used as the basis for institution building, and to illustrate the kind of dynamics that have led to change in the past. Appreciating the history of this process of change and development can, we hope, better equip us for addressing upcoming challenges, whether by opening up the conceptual history to debate by a wider range of stakeholders, allowing newcomers to understand the reasons behind current formulations in the field, or by allowing those involved in researching NL to understand that for this field, as in all social endeavours, change is the only constant.

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Networked Learning as a Framing of Society

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Abstract

The main purpose of this paper is to explore the idea of conceptualising networked learning, not as a kind of human activity, but as a way of viewing human activities. The hope is to promote collaborations and connections between the field of networked learning and other fields, in ways that may ultimately transform, mutate, and hybridise the fields. To achieve this, four metaphors of society is outlined. These are named the biosphere, the distorted reality, the community, and the market. The metaphors serve as foundations for four different framings of society that directs attention and raises questions about learning. It is noted that by combining several frames, it may be possible to approach networked learning in a more thoughtful, nuanced, and well-balanced way. It is also noted that the use of frames could make it possible to move beyond what has been called the impasse of ideology in the field of networked learning.

Keywords

Networked learning, frames, metaphors, ideology.

Introduction

The Networked Learning Editorial Collective (NLEC, 2020) propose a revised definition of networked learning:

> Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies. (p. 319)

They argue that one important consequence of this definition is that:

> Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources and solutions, across time, space and media. (NLEC, 2020, p. 319)

By using the concept of convivial technologies, the Networked Learning Editorial Collective stress the importance of critical and emancipatory studies of networked learning. They argue that the criticism within the field has often been reserved for "technological evangelism and the predatory commercial behaviours of players in the educational technology industry" (NLEC, 2020, p. 317). Although this kind of criticism may "provide a brake on education's susceptibility to fads, fashions and quick fixes" (NLEC, 2020, p. 317), they also note that:

> Scanning through the papers presented at networked learning conferences and through chapters in the corpus of networked learning books, one finds very little – not nothing, but surprisingly little – on such areas as critical race studies, postcolonialism, indigenous knowledge, class, gender studies, queer theory, disability studies, green and blue environmentalism and sustainability. Contributions and theory from disadvantaged spaces and the Global South are few and far between. (NLEC, 2020, p. 317)

Apparently, many stones are left unturned. This is why the Networked Learning Editorial Collective include the concept of convivial technologies in their definition. Convivial technologies are technologies that support shared social or political projects (Illich, 1973). However, as noted by several authors in a community response (Gourlay et. al, 2021), this is hardly a sufficient remedy. To attract researchers and practitioners from the field of critical and emancipatory studies, there is a more fundamental issue that needs to be addressed:

The Networked Learning Editorial Collective define networked learning by providing a set of characteristics that distinguishes human activities that are examples of networked learning from human activities that are not. If, for example, a certain human activity is not underpinned by trusting relationships and does not promote connections, it is, according to the Networked Learning Editorial Collective's definition, not an example of networked learning. In other words, the definition provided by the Networked Learning Editorial Collective creates a social category that distinguishes human activities that are examples of networked learning from human activities that are not examples of networked learning. By extension, researchers and practitioners belonging to the field of networked learning are distinguished from those who do not belong to the field by their objects of study.

The social construction of reality by language and social categories is one of the main interests of researchers and practitioners in the field of critical and emancipatory studies. They may therefore be interested in studying how the field of networked learning is socially constructed and what the consequences of this are, but they might not be tempted to join forces with researchers and practitioners within a field that is perceived as a social category with clear boundaries. Consequently, it does not help to simply add the concept of convivial technologies in the definition of networked learning. Nor is it sufficient to remove some of the excluding characteristics listed in the definition given by the Networked Learning Editorial Collective. Even the overly inclusive definition that "networked learning is learning in networks" would create the same problem. It would still create a social category that distinguishes human activities that are examples of networked learning from those that are not, and, by extension, it would still distinguish insiders belonging to the field from outsiders that do not belong to the field.

A related issue is that researchers and practitioners from different fields may be interested in different social units. For example, in the field of networked learning, there is, of course, an interest in social networks, and in the field of critical and emancipatory studies there is an interest in social categories and the stratification of society. These are two very different ways of understanding the social world. Researchers and practitioners who argue, like Castells (2000), that social networks have come to constitute a new social morphology of society, also implicitly argue that social categories are no longer as important. This may not be the best way of attracting researchers and practitioners from the field of critical and emancipatory studies. Neither may it be the best way of attracting researchers and practitioners from fields where focus is on other social units, such as dyads, groups, organisations, or communities.

To attract researchers and practitioners from other fields, Knox (in Gourlay et. al, 2021, p. 359) proposes that the concept of networked learning must be allowed to become networked itself, in the sense that it is allowed to make connections, interrelate, transform, mutate, and hybridise in response to the pressing issues of our time. A similar idea is proposed in the current paper. The idea is to conceptualise networked learning, not as a certain kind of human activity, but as a way of viewing human activities. Put differently, "networked learning" will not be used to label human activities, but to label views on human activities. This idea implies

- that any human activity can be viewed from a networked learning view, even though not that every human activity may be very interesting to view from a networked learning view,
- that one way of viewing a human activity may be complemented with others, and, for example, a traditional networked learning view may be complemented by a critical and emancipatory one,
- that any human activity can be viewed as learning in multiple social units at the same time, including dyads, groups, organisations, networks, and communities, and
- that any view of a human activity may be revised at any time, in response to pressing issues or to accommodate for changing interests.

Consider, for example, a certain chat conversation between two people. When trying to understand this human activity, it is possible to ask questions about how and to what extent it promotes connections in networks, as well as asking questions about how and to what extent it produces, reproduces, or transforms social categories. In the first case, the view is similar to the one portrayed by the Networked Learning Editorial Collective. In the second case, a critical and emancipatory view on human activity is being used. Furthermore, it is possible to combine different views and for example ask questions about how the promotion of connections in networks produces, reproduces, or transforms social categories and vice versa. Consequently, researchers and practitioners that has a background in the field of critical and emancipatory studies, but are new to the field of networked learning, not only have something valuable to contribute to the field of networked learning but may also learn something that turns out to be a valuable contribution to their own field. This may promote collaborations and connections between the two fields in ways that ultimately may transform, mutate, and hybridise them.

If any human activity can be viewed from a networked learning view, there is no need for a definition of networked learning that distinguishes between human activities that are worth investigating and those who are not. On the contrary, it could, for example, be interesting to investigate when and how fads, fashions and quick fixes may become valuable against all odds, what learners learn when they struggle with isolation, troublesome relationships, or badly designed technologies, or what strategies teachers use when they try to resist predatory commercial behaviours of players in the educational technology industry. This also means that there is no need to draw a clear line between insiders and outsiders of the networked learning field.

In fact, there is no need for a definition at all. Instead, researchers and practitioners need to make clear what their view or views are. It is the chosen views that need to be described and made visible, not the defining characteristics of the study objects.

The main purpose of this paper is to explore the idea of conceptualising networked learning as a way of viewing human activities. With inspiration from Dewey (see Dreon, 2019) and Goffman (1974) this is done by using so called frames. The concept of a frame is introduced in the next section. In the section after that, a frame is introduced with the aim of capturing the networked learning view portrayed by the Networked Learning Editorial Collective. Then, three sections follow where three other frames are outlined. These are examples on other possible ways of viewing human activities that may be of interest when studying or designing for networked learning. All four frames should be understood as tentative and open for revision. Also, the list of proposed frames is not intended to be exhaustive. Other frames could be added. The paper ends with some concluding remarks.

The paper builds upon a chapter in a forthcoming book (Brandén, 2022).

Frames

The concept of a frame is a metaphor. Framing something is like looking at it through a picture frame. Depending on the positions of the observer and of the frame, different things appear.

Several examples of frames can be found in the textbook *Reframing Organizations* by Bolman and Deal (2021). They use four different framings of organisations:

- If an organisation is framed as a factory, it directs attention to the division of labour and the rules, routines, systems, and hierarchies that are used to coordinate activities.
- If an organisation is framed as a family, it directs attention to relationships between people and what needs, desires, skills, and limitations they have.
- If an organisation is framed as a jungle, it directs attention to how people create coalitions around different interests to compete for limited resources.
- If an organisation is framed as a temple, it directs attention to how different cultures are maintained through rituals, ceremonies, and the retelling of myths and stories.

The factory, the family, the jungle, and the temple are metaphors that Bolman and Deal (2021) use to direct the reader’s attention. This is not only a convenient way of organising the material presented in the book, but also a way of relating to the material that may provide a better understanding of organisations. Consider, for example, a reorganisation. The factory framing then raises questions about how the relationship between roles and tasks changes in the organisation, the family framing raises questions about how the relationship between roles and people's needs changes, the jungle framing raises questions about how power is redistributed, and the temple framing raises questions about how the image of the organisation's management changes. Correspondingly, other events in an organisation, such as an evaluation, writing a vision statement, a meeting, or deciding something, can be framed in several different ways. Each framing directs attention and puts forward certain types of questions. With more frames, a more complex and multifaceted picture of an organisational event may emerge. This makes it easier for managers and employees to approach the organisation's complex challenges in a more thoughtful, nuanced, and well-balanced way.

Using a metaphor is one way of framing something. A metaphor contributes with a system of concepts that makes it possible to put experiences into words. At the same time, a metaphor also provides a symbolism that makes these experiences meaningful and comprehensible. This is true also for frames that does not build on metaphors. A frame is in this paper defined as

- a system of concepts that makes it possible to communicate about certain experiences and
- a symbolic system that makes such experiences comprehensible.

Bolman and Deal (2021) argue that a frame could be understood as a mental model. Such mental models are referred to in the literature under names such as maps, mindsets, schemas, or lenses. At the same time, Bolman and Deal's four metaphors are not chosen arbitrarily, but derived from four different research traditions. This suggests that metaphors and frames may be shared among people and could consequently also be understood as social patterns. This seems to be closer to the way Dewey (see Dreon, 2019) or Goffman (1974) understand frames, as noted by the authors themselves.

How many frames are there? Bolman and Deal's four frames are certainly not the only frames that have been used to study organisations. For example, Morgan (1997) uses machines, brains, organisms, cultures, psychic prisons, systems of politics, transformation, and tools of domination as different metaphors for organisations. It is also possible to introduce new frames that directs attention to gender equality, intersectionality, organisational learning, or anything else that is of interest. In other words, frames can be used both to capture past and ongoing activities within a field and to broaden a field by directing attention in new directions and to put forward new questions.

The approach in this paper is similar to that of Bolman and Deal (2021). In the next section, a metaphor is proposed with the intention of capturing a traditional networked learning view. The analysis in that section indicates that the associated tentative frame builds upon on a consensus theory as well as a theory of collectivism. A distinction between consensus and conflict theories and between theories of individualism and collectivism makes four different combinations possible, see Table 1. The frame derived in the next section is an example of what is labelled as Combination 1 in the table. In the upcoming sections, one possible frame is proposed for each one of the other three combinations.

	Consensus theories	Conflict theories
Theories of collectivism	Combination 1	Combination 2
Theories of individualism	Combination 3	Combination 4

Table 1: Four ways of framing society

The four different metaphors and their corresponding tentative frames are derived using inspiration from four different traditions. There is no ambition to be completely true to any of these traditions. Focus is not on sorting out the history, but to derive metaphors and frames that may serve the purpose of this paper.

The metaphors introduced by Bolman and Deal (2021) are metaphors of an organisation. The metaphors in this paper are metaphors of society. Since social networks are often understood as societal units, the society seems to be one suitable level of analysis.

The biosphere

Networked learning grew out of practices in open and distance learning where computer-mediated communication was being used. One early definition was given by Steeples and Jones (2001):

> We define 'networked learning' as learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources.

This definition has persisted surprisingly well. At the same time, several authors have argued that promoting connections is not a sufficient criterion for networked learning (see for example Goodyear, 2001). The principle of collaboration has also been present for a long time. For example, Hodgson, Lewis, and McConnell (1989) wrote:

> We have sought to take a 'developmental' orientation to our work and see open learning as allowing learners to define their own learning and personal development needs through processes of negotiation, collaboration and cooperation (p. 137).

This suggests that one original objective in the field of networked learning was to design courses in open and distance learning that promoted certain types of learning. Steeples and Jones (2001) talk about learning that

promotes connections and Hodgson, Lewis, and McConnell (1989) want to allow learning through processes of negotiation, collaboration, and cooperation.

Gourlay (in Gourlay et. al, 2021) points out that these kinds of definitions, including the one proposed by the Networked Learning Editorial Collective (NLEC, 2020), are of a somewhat utopian nature, since they

> implicitly favours a particular type of human – confident, articulate, orientated towards observable 'connections' – and implicitly unhindered by the frequent structural and symbolic violence suffered online by those of us considered less-than-human, such as women, people of colour, LGBTQ people, differently abled people and so on. (Gourlay et. al, 2021, p. 359)

One possible conclusion from the point made by Gourlay is that there are at least two implicit objectives embedded in this way of approaching networked learning. One objective seems to be to develop an understanding of networked learning that builds upon a consensus theory of society. Consensus theories view shared values and silent agreements as a foundation of social order, harmony, and the possibility of slow change. Such theories are often contrasted with conflict theories. Conflict theories focus on how differences in interests create tensions and conflicts. The prevailing social order is understood as a consequence of some people dominating others by consciously or unconsciously influencing or manipulating them, something that may change abruptly if those dominated manage to take control. The different focuses in consensus and conflict theories have been the subject of a recurring debate throughout the history of Western thought (Bernard, 1983).

Another objective seems to be to develop an understanding of networked learning that builds upon a theory of collectivism. Theories of collectivism put the collective before the individual based on the assumption that what is good for the collective is also good for the individual. They tend to argue that power should be put in the hands of the collective as a whole and that decision-making should be a collective process. Theories of collectivism are often contrasted with theories of individualism. Theories of individualism put the individual before the collective based on the assumption that what is good for the individual is also good for the collective. They tend to focus on human independence and are in general against external interference regarding personal choices. For an in-depth discussion about individualism and collectivism, see Triandis (1995).

One metaphor that directs attention to how shared values and silent agreements enable slow change and how the good of the collective benefits the individual can be found in the writings of Barnett and Bengtsen (2017). They argue that universities of today need to become ecological universities that are sensitive to "at least seven ecosystems: those of knowledge, the economy, social institutions, learning, individual persons, culture, and the natural environment" (Barnett & Bengtsen, 2017, p. 9). Drawing on this metaphor of ecosystems, the global society of today can be compared to the earth's biosphere, which consists of ecosystems where actors and resources are connected in networks. This society is governed by natural selection. Actors, ideas, and activities that manage to adapt to changing circumstances and to utilise connections in different ecosystems flourish and grow stronger. Ideas and activities that are no longer fit for today's society wither and eventually go extinct.

The framing of society as a biosphere is intended to direct attention to the type of questions that are portrayed in the definition of networked learning proposed by the Networked Learning Editorial Collective (NLEC, 2020): How does collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, trusting relationships, shared challenges, and convivial technologies (or communication technologies in general) promote connections?

The distorted reality

To derive a framing of society that is an example of Combination 2 in Table 1, the critical pedagogy of Freire (2018) seems to be a suitable source of inspiration. It directs attention to how differences in interests create tensions and conflicts and how joining forces benefits individuals.

Freire was active in Brazil in the 1960s and took part in a campaign against the country's widespread illiteracy. For Freire, this was not just about teaching people to read and write. It was also a fight against poverty and hunger and, by extension, against a totalitarian military state that thrived at the expense of the population.

A central idea in Freire's pedagogical thinking is that education is never something neutral. An education is formed in relation to prevailing social and political conditions. This means that it explicitly or implicitly conveys a certain

way of relating to such circumstances. Just as education can educate learners to obedience and submission to a prevailing system, education can encourage people to think for themselves and to form their own opinions. The latter is an important objective of Freire's critical pedagogy.

If change is sought, a challenge for teachers is to create hope so that students may start to believe that change is possible. To succeed, Freire believes that teachers cannot see learning as an object of teaching. Learning cannot be to fill empty bank accounts, to use one of Freire's most famous metaphors, and knowledge cannot be reduced to a currency that is deposited in students and withdrawn when needed. More generally, pedagogy cannot be created *for* those who study.

Freire's alternative is a pedagogy created *with* those who study. At the centre, Freire places the dyad and the dialogue between teachers and students. The student's role is to bring their preconceptions and perceived reality into this dialogue. The teacher's role is to be a co-investigator and, together with the student, critically explore the student's lifeworld by, for example, asking problematic questions.

Critical pedagogy can be viewed as an application of critical theory. Critical theory has its roots in the so-called Frankfurt School, which includes thinkers such as Fromm, Marcuse, Adorno, Horkheimer and Habermas. A central idea that can be found in early Frankfurt School theorists is that communication is never neutral. What people talk about and how they talk about it, distorts the perception of reality. According to this view, adopting a dominant way of communication can maintain a prevailing social order. To create change, what has been invisible first needs to be made visible and questioned.

Thus, one metaphor that depicts a critical view of society is that of the distorted reality. A society that is framed as a distorted reality is a society where oppressors establish metaphors like the biosphere to maintain a prevailing social and political order that benefits the oppressors at the expense of the oppressed. The metaphor of the distorted reality directs attention to communication and how it distorts people's perceptions. In the context of networked learning, attention is directed towards hidden and oppressive aspects of networked learning, how these aspects can be made visible, and how networked learning with shared efforts may become an emancipating force. Studying and challenging heteronormativity, sexism, racism, ableism, classism, and the like, for example by deliberating dialogues between teachers and students, could be one important part of this.

The community

To derive a framing of society that is an example of Combination 3 in Table 1, the German Bildung tradition is used as a source of inspiration in this section. It directs attention to how shared values and silent agreements enable slow change and how the good of the individual benefits the collective.

The modern idea of Bildung originated in Germany at the turn of the century 1800 (Östling, 2016). The concept was launched by Wilhelm von Humboldt and other humanists as an alternative to the goal-directed learning that the vocational education of the time had to offer. Inspired by Plato and Aristotle, Bildung was seen as synonymous with personal development and the realisation of an inner potential. Unlike the ancient Greeks, however, the German humanists believed that there was no end in sight for such a journey. On the contrary, realising oneself through studies and reflection was a lifelong process.

When the University of Berlin was founded in 1810, Humboldt was active in the Prussian Ministry of Education and came to play a crucial role in the establishment of the new university. Around the same time, he put his thoughts about Bildung on print. These included (Östling, 2016):

- First, research and teaching should go hand in hand. The teacher's role was not only to teach, but also to research and teach things that the teacher was researching. It should give the teaching a solid scientific basis. Thus, universities should not only reproduce knowledge, but also produce it. The view of knowledge was far from instrumental. Knowledge should be valued on the basis of scientific criteria, not on the basis of its possible usefulness. Thus, basic research was also valuable.
- Secondly, academic freedom should prevail (*Lehr- und Lernfreiheit*). Those who researched and taught were best suited to decide what research and teaching that should be done. The student's role was to choose the subjects to study. Great confidence was placed in the student's ability to decide what best served the student's personal development. Furthermore, the student was assumed to be curious, interested in scientific issues, and have a strong will to learn.

- Thirdly, Bildung should be more important than vocational training. The student should be given the opportunity to realise their inherent potential and to develop as a person. Bildung required, among other things, a broad education. Thus, studies in philosophy, literature and history were valuable, even if the student studied to become an engineer or a medical doctor, for example.

Humboldt's idea of Bildung made it possible to talk about learning and education as a means to realise the inner potentials of individual students, teachers, or higher education institutions. Granting members of the academic community academic freedom was one important part of this. This could foster well educated, self-sufficient, and critical-thinking individuals who could contribute to the community. This idea parallels the ideals in ancient Greece, where well developed rhetorical skills distinguished a truly educated man and where the ability to persuade others was seen as crucial for a free citizen. This made it possible for a citizen to participate in public debates, exercise civil rights, and contribute to democracy.

However, given that higher education has historically excluded both women and those who do not belong to society's upper classes, it may be that the academic community that Humboldt was thinking about was not very inclusive. As with the democratic state in the ancient Greece, Humboldt's academic community could have been reserved for a selected few. To capture this way of thinking, society can be framed as the community (or the communities) one belongs to. In such a society, a community acts as a shield, protecting its members from outsiders. Also, members do not have many responsibilities for those who do not belong to one's community. This made the democratic state in ancient Greece possible. It may also be a contributing factor to higher education's long history of reproducing a prevailing social order in society (Bourdieu, 1998).

The framing of society as a community directs attention to how freedom given to individuals by the support from other members of the community and by protection from outsiders may help them realise their inner potentials, possibly as a lifelong learning process, and thereby becoming an increasingly valuable asset for society. In the context of networked learning, this place focus on creating and maintaining learning communities. Lave and Wenger's (1991) Community of Practice and Vaughan, Cleveland-Innes, and Garrison's (2013) Community of Inquiry are two theories that fit nicely into this frame. The frame may also direct attention to questions about transfer and boundary crossings (Akkermann & Bakker, 2011).

The market

The fourth and final metaphor of society that is introduced in this paper is the market. It is an example of Combination 4 in Table 1. It directs attention to how competition between individuals and organisations may benefit everyone in the long run.

In the 1980s, political leaders such as Margaret Thatcher and Ronald Reagan argued that the public sector had become too costly. To make it more cost-effective, they proposed that public organisations, such as universities, should be governed in a more goal-oriented and hierarchical way. The idea was also to expose public organisations to competition. For example, universities should operate in a market where they competed for students, labour, and research funding. This was the beginning of a trend in the western world that is usually called New Public Management.

New Public Management has contributed to a market-oriented education model for higher education that has been called academic capitalism (see for example Münch, 2014). A metaphor that has been used to describe the university's societal role in academic capitalism is the knowledge factory. In the knowledge factory, it is important that education is produced in a rational and efficient way. A large number of students must be able to assimilate their educations in a short time and at low costs. The knowledge factory's productivity is measured in terms of throughput, that is, the proportion of students who complete their courses and educational programmes on time.

The educations that the knowledge factory produces need to be sold to students. Thus, the knowledge factory needs to promote its brand and market its educations to potential students. Advertising at bus stops, using influencers on social media, or recording commercials are some examples of how knowledge factories can market their products. More generally, the knowledge factory needs to develop strategies to survive in competition with other knowledge factories. It can, for example, focus on a niche where the competition for students is not as big, to become very good at a certain type of educations, or to offer a particularly attractive study environment.

The teacher's assignment in the knowledge factory is quite different from the researcher's. In large parts of the western world, administrators have been given increasing responsibility for the development and evaluation of courses and educational programmes. This trend is most pronounced in the USA, where a large part of the work on the courses is carried out by special development units. Thus, almost all teaching can be carried out by teachers with fixed-term employment who carry out already planned teaching activities.

The student's role is to be a consumer and to consume an education that the knowledge factory sells. The education that the student chooses is assumed to be the one of several pre-packaged products that best respond to the student's wishes. Not least, it is about the product being able to be resold in the labour market after completing education. The students who adopt the consumer metaphor typically sees themselves as a recipient of education and knowledge.

In the knowledge factory, educations are thus products that are marketed and sold to students so that they in turn can sell them on in the labour market after completing their education. In this metaphor, the view of knowledge is instrumental. Knowledge has no value in itself but is only valuable if it can be used. It must make it possible to fulfil learning objectives in courses and degree objectives in educations, as well as getting a job after graduation.

When higher education credits and diplomas are highly valued, specific subject knowledge and the ability to solve concrete problems in given situations tend to be prioritized. Little room is given for curiosity or to explore the unknown, as well as to develop critical thinking and independence. More generally, demanding elements in courses tend to be seen as obstacles and as an ineffective form of teaching, rather than as an opportunity to broaden or deepen their knowledge.

In other words, the market metaphor makes it possible to talk about knowledge, learning, and education with the help of a language that is taken from business management models. Education is marketed and produced, students are customers and consumers, and knowledge is a resource that can contribute to economic growth. The market as a metaphor of society consequently directs attention to how market forces and competition between individuals transform individuals, higher education institutions, and the society itself. In the context of networked learning, this may raise questions about why, how, and what teachers teach, as well as why, how, and what students learn when individualism and competition is encouraged.

The political discourse by leaders such as Margaret Thatcher and Ronald Reagan was that individualism and competition benefit everyone in the long run. The most common critique against this claim is that New Public Management and the prevailing market-oriented education model has led to uninterested students, substitutable teachers, instrumental knowledge, and other negative consequences mentioned in this section.

Does this mean that learning never benefits from individualism and competition? Is it better to completely avoid using a market framing of society? Or are the negative consequences of New Public Management due to the fact that the market frame has become the *only* way of framing society when governing education? What would happen if several frames were used and were allowed to complement each other?

Concluding remarks

Four metaphors and framings of society have been outlined in this paper. These are the biosphere, the distorted reality, the community, and the market. The main purpose has been to explore the idea of conceptualising networked learning, not as a certain kind of human activity, but as a way of viewing human activities. The hope is that this will promote collaborations and connections between different fields in ways that ultimately may transform, mutate, and hybridise them.

The proposed frames can be used to direct attention. Consider, for example, the chat conversation mentioned in the introduction of this paper. If society is framed as a biosphere, it directs attention to how collaborative, co-operative, and collective inquiry promotes the connection between the two persons and vice versa. If society is framed as a distorted reality, it directs attention to how the language that the two persons use and learn produces, reproduces, and transforms social categories and vice versa. If society is framed as a community, it directs attention to the communities that the two persons are a part of and how these communities support the two person’s learning and vice versa. If society is framed as a market, it directs attention to how competition between the two persons and other actors transforms them and to whom this may be beneficial in the long run.

One consequence of moving from social categories to frames seems to be that different understandings of the field of networked learning may complement each other, instead of being mutually exclusive. Combining several views of networked learning could make it possible to approach the complexity of networked learning in a more thoughtful, nuanced, and well-balanced way. This idea is line with an observation made by Bolman and Deal (2021): They argue that a lot of confusion and conflicts in organisations originate from the fact that different members of organisations unknowingly use different frames and consequently are unable to understand each other. If this is true, then problems arise not when a preferred frame is "bad" or "wrong", but when it becomes the only one being used.

Another consequence of moving from social categories to frames seems to be that focus is changed from what networked learning is, or what it is for, to what the field of networked learning is for. This may encourage reflections about ideological assumptions. For example, the distinction between consensus and conflict theories, as well as the distinction between theories of collectivism and individualism, has been discussed in this paper. Furthermore, by combining frames, it may be possible "to move beyond to the impasse of ideology" as Knox (in Gourlay et. al, 2021, p. 359) puts it. When there is no need to uphold a particular ideological position, an ideological standpoint may be transformed into one of several possible objectives within the field, objectives that may turn out to complement each other, or require some balancing, instead of being mutually exclusive.

One possible interpretation of the community response (Gourlay et. al, 2021) to the call from the Networked Learning Editorial Collective (NLEC, 2020) is that it is no longer possible to simply assimilate new ways of understanding networked learning into the traditional way of doing it. Instead, there is a need to accommodate and restructure the traditional understanding. Whether or not frames will be a part of the next paradigm remains to be seen.

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Narrowing the definition of Networked Learning: A demarcation from the learner centred perspective

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Abstract

This is a conceptual-philosophical paper and its intention is to address the issue of the definition of Networked Learning which is currently under discussion within the Networked Learning Editorial Community and revolves around the intellectual foundations on which the concept of NL rests. These intellectual foundations are according to some, myself included, overly inclusive and would benefit from some demarcation. This paper suggests such a demarcation through the dissociation of NL from the cognitive constructivist learner-centred perspective on education, which would define Networked Learning more clearly with respect to other adjacent research communities and educational concepts (e.g. Learning Sciences). The dissociation from learner-centrism is argued for on epistemological, pedagogical, and ideological grounds within the context of formal education, and a content-centred perspective is suggested in its stead.

Keywords

Cognitive constructivism, Content-centrism, Democracy, Formal Education, Learner-centrism, Philosophy of Education, Traditionalism.

Introduction

Education as an academic discipline can historically be understood as a field of tension between three major lines of thought, as conceptualized by Egan (1997). These three can be interpreted as focalizing each of the three components of the "holy trinity" of education, respectively: the teacher, the knowledge and the learner. The first educational tradition, which Egan calls ‘socialization’, is the schooling tradition in which the “central task … is to inculcate a restricted set of norms and beliefs – the set that constitutes the adult society the child will grow into” (Egan 1997, p. 11). This pedagogy corresponds to what is nowadays oftentimes derogatorily called teacher-centrism. A parallel can also be drawn to Lefebvre's term 'dressage', referred by Selwyn (2014) and explained as "implying a process of repetition and the individual being 'broken in' like an animal, and therefore being shaped to the accepted values of a wider society or group", (Selwyn 2014, p. 97–98).

The second tradition that Egan (1997) describes, originates from the platonic idea that the goal of education should instead be to create minds that “transcend conventional beliefs, prejudices, and stereotypes of the time and come to see reality as it really is”, and doing so by initiating learners to “the great cultural conversation” which has been going on ever since the beginning of civilization and which only academic knowledge can give full access to, a kind of knowledge which “is valued less for its social utility than for its presumed benefit to the mind of the student” (Egan 1997, p. 13–15). Education should thus lead to an understanding of how one is situated in the history of mankind. This perspective has lived on through modern traditionalists such as R.S. Peters (Degenhardt, 2010; Peters, 1966). With this outlook neither the teacher nor the student is the focus of attention but the knowledge, or the content.

The third tradition is the child or learner -centred tradition, and the first seed for this perspective was planted when Rousseau with his famous ***Émile, or On Education***, reacted to the platonic idea of the cultivation of mind, and instead proposed that we ‘go back to nature’ and let her guide our quest for knowledge. The tradition further evolved through Spencer’s and Dewey’s progressive pragmatism and Piaget’s and Papert’s cognitive constructivism (Egan, 2002). The idea here is that learning needs to go from the familiar to the unfamiliar, from the concrete to the abstract, from practice to theory, and not the other way around. The learning process is thought of as a reflection of the scientific method, where the learner gains knowledge about her world through experience, exploration and active inquiry and from this, builds, tries out, and refines her understanding of how things are, and knowledge is valued by its practical utility and personal relevance.

The first, teacher-centred tradition, or as Peters (1966) called it 'the moulding model', has some unattractive connotations of indoctrination and few educationalists of today are likely to defend it. But the other two are still being debated and they are incompatible with one another. Of course, it should be recognized that content-centrism

is more prominent within the humanities and learner-centrism is more associated with the STEM[1]-subjects, but in the field of pedagogy these two are in a sense competing for the title of Grand Theory and scholars of both traditions are making claims to explain all of learning. They are in a sense, for pedagogy what quantum mechanics and general relativity are for physics, they both seem to hold when scrutinized in isolation, but contradict each other when compared. Therefore, either one or the other is eventually going to have to conform to fit the other or both will have to go (which is as unlikely in pedagogy as it is in physics). However, in reality few pedagogues have a teaching style which is a hundred precent either learner or content centred but a mix between the two, as Egan underscores. In fact, according to Egan the confusion between these initially three contradictory perspectives, which I have here taken the liberty of reducing to two is the most profound problem we have within education. Degenhardt (2010) similarly writes of a "…knowledge-centred vs. child-centred divide that has developed in education since the eighteenth century." (p. 126).

A possible but not necessarily exclusive conception of a "learning network" is the mental network of connections and relations between instances of knowledge which is the result of learning. With this conception, the learner-centred view would be that this network is ***constructed*** piece by piece, by each unique learner as they interact with the world. The content-centred view would be that this network is ***revealed*** piece by piece to the learner as they gather information about the world, since it already exists irrespectively "outside" of the learner as the fabric of socio-cultural history, though understanding and personal opinion of it may vary depending on individual perception. As it is currently posited, the intellectual foundation of Networked Learning incorporates both of these opposing perspectives, which may cause confusion within the community. Networked learning is an educational idea which rests on the power of human communication and at the centre of human communication for learning, there is of course a topic of discourse, a content, around which participants – teachers and students – can gather. Therefore, I argue that NL in the context of formal education, should be defined as a content-centred learning concept. Table 1 gives a summary of the two perspectives.

	Learner-centrism	Content-centrism
General idea	Learning as a reflection of the scientific method: exploration, experimentation, hypothesizing and testing leads to personal theory building and to gaining personally relevant knowledge	Learning as a recapitulation of human development through cultural history: General theories and academic knowledge are studied for their cultivating effects on intellect and for guiding practice
Teacher Focus	The structure and significant features of the mind of the learner	The structure and significant features of the subject content
Didactic approach	Active inquiry Learning-by-doing Hands-on practice Understanding through experience	Explicit instruction Intellectual tools for understanding Reflection and contemplation Understanding through imagination
Learning metaphor	The jigsaw puzzle: a picture is built piece by piece (atomistic view)	The camera lens: the whole picture gradually comes into focus (holistic view)
Value of knowledge	Practical utility for individual and society	Empowerment from cultivation of the mind

Table 1: A summary of the general characteristic differences between learner-centrism and content-centrism, loosely based on Egan, 1997 and 2002.

Discussion

Since these two perspectives have a long history, they have been called by various names other than the ones I have chosen to use here. Cunningham and Allen (2010, cf. Cronje, 2006) describe these two "major epistemological perspectives" as such: "…the first is objectivism, also known as realism, which is the view that knowledge is produced by the impact of external reality onto the senses; the second is constructivism, also known as pragmatism, which is the view that knowledge is created through the meaning making activities of each person's mind." (p. 486). From this description it becomes obvious why scholars of the learner-centred tradition believe that the main concern of education research is to understand the psychology of the mind and how people learn, whereas scholars of the other tradition are more prone to begin with the rather philosophical question of what people need to know about. Invoking science is always to make a stronger truth claim than that of a philosophical argument, and stronger claims of course require stronger evidence. However, as argued by Reagan (2006; 2010),

[1] Science, Technology, Engineering and Mathematics.

much of what goes by the name of educational psychology is no less metaphorical in its discourse than purely philosophical discussions of education. Indeed, it cannot be denied that knowledge, by definition, cannot exist outside the mind of a knower and hence cannot be transferred from another mind or any other external source, and thus must be constructed by each individual learner in some sense. However, constructed and created are not the same, as Vygotsky points out, using his favourite example of language acquisition:

> How did you and I develop our power of speech? After all, we did not create this speech by ourselves. Humanity created it during the entire course of its historical development. My own development consists of the fact that, during the course of my general development, I mastered this power of speech following the historical laws of my development and through the process of interaction with the ideal form. But can you imagine what would have happened if I had found myself in the same circumstances as a deaf child, where I would have had to create my own language? I would not have been able to make use of the form which has been shaped during the course of the development of humanity. I would not have got very far, I would have created speech whose dimensions would have been very primitive, elementary and circumscribed. (Vygotsky, 1994, p. 352).

Just as the content-centred 'objectivist' realizes that understanding and remembering are not transferrable objects, so does the cognitive constructivist of course realize that knowledge does neither simply appear in isolated minds without interaction with something or someone else. The latter does however tend to refute secondary accounts such as literary sources of information and insists that learning must be a first-person experience and a personal discovery. This reasoning has strong roots in Rousseau, who would not let his fictional pupil Émile read any books, instead he was to learn and understand from personal experience. One telling example is how Émile and his tutor covered the subject of astronomy by observing the movement of the sun and the shadows it produced, instead of reading about it in a book. However, this is a romanticised and unrealistic picture which ignores that it took several of humanity's most prominent thinkers, centuries upon centuries of meticulous systematic observation and analytic work, to form the astronomic theories we now teach and have easy access to in our libraries. What Émile's tutor could perhaps have induced in him through this practice is a curiosity for astronomy, but anything but a very shallow understanding of the celestial objects and processes is impossible to acquire from observation alone, since most of what we now know about the subject was discovered theoretically and is not directly observable. And I am afraid the same may be the case for most other subjects.

Much of the discovery- or inquiry-based learner-centric educational ideas, derive from a desire to mimic 'natural learning', that is, the way learning happens in the real world of active doings and interaction with things in the environment, outside of the artificial world of the school and its supposedly passive and unnatural reading and writing. Procedural knowledge is favoured over propositional knowledge and thus it is believed that classrooms ought to be re-modelled as active learning environments or so-called 'makerspaces'. But being an active learner does not necessarily entail interacting 'hands-on', with the physical environment, reading and writing can be just as active an exercise with the right didactics, and it is highly questionable whether active learning areas really provide a more accurate account of the 'real world' than a literary narrative could. The exploration of one's spatial environment to gain personal experience gives a very restricted, or in Vygotsky's words, primitive, elementary and circumscribed, view of the world. But humans are not bound by these restrictions as are the rest of the animal kingdom, since we have evolved into socio-cultural beings with a mind capable of imagination thanks to language, which allows us to transcend and go far beyond our immediate surroundings, through literature (Egan, 1997). This uniquely human and powerful ability of imagination makes it possible for us to theorize and reason, to imagine more than one perspective and predict counter arguments which would challenge our own position, to ask ourselves critical questions, to meta-reflect etc. even in conversation with none but ourselves.

Vygotsky (1934/2012) would describe the process of mastering this ability as the transition from thinking via inter-personal, external speech, to thinking via intra-personal, inner speech. With his "theory of the interaction of ideal and rudimentary forms" (Vygotsky, 1994, p. 351), a sort of sub theory within the socio-cultural framework, Vygotsky states that the environment is the very source of development. But an important distinction from other environmentalist theories is that Vygotsky does not argue for interaction with the environment per se, but for interaction with the ideal form, which in turn can only be found in the environment. Important to notice however, is that 'the environment' is here to be understood in a very broad sense as all that is not hereditary, which is a lot more than just one's physical surroundings at a given moment. The reason is that 'higher-level' and characteristically human traits and activities are socio-cultural by their nature, meaning that they have been developing socially and culturally over the ages along with humanity at large. Ideal forms are not inherited genetically, they are internalized from a source outside of the learner, i.e., somewhere in the environment. However, if interaction with the environment is to lead to development – in other words progression towards the

ideal form – a crucial requirement is that said environment carries in it this ideal form. Just interacting actively with others, in other words behaving socially, will not lead to development if those others do not represent the ideal form, or at least a higher form than the learner's initial form. The problem is that many pedagogues and scholars who use the expression “all learning is social” with reference to Vygotsky, tend to also indicate the reversed relationship: “all social interaction equals learning”. While this may in some sense be true, it is nevertheless a misunderstanding of Vygotsky and his theory, because socio-cultural theory does not concern all of learning, but particularly human learning. Being social is not specific to humans, all animals are social and learn from interaction with each other, even insects exert such behaviour. Therefore, all learning may be social, but only human learning is cultural, and it is this cultural learning that is the main concern of organized education. The point is that 'natural learning' of 'natural knowledge' does not require any education and consequently no education research either, because it simply happens by itself. It is the unnatural knowledge of culture, that requires organized education with its unnatural learning methods.

The role of the environment in socio-cultural theory is that for to develop socio-cultural knowledge, skills, and behaviour, the learner will need an environment in which he or she can interact with role models of such knowledge, skills, and behaviour. A problem with the learner-centred and self-regulated - verging on anti-teaching - pedagogy, is that the teacher as a role model who personifies and exerts the ideal forms has, more or less, been taken out of the equation. The teacher as role model has mistakenly been confused with the teacher as authority. And with literary role models also restricted, students will have very few sources left for inspiration and guidance. Instead, students are expected to direct themselves and inquire their way to understanding. This places the responsibility on the learner to know what they do not know, to know what to ask about and what would constitute an answer. However, these abilities are not the road to knowledge, they are the result of knowledge, as problematized by Plato in Meno. It cannot be the responsibility of the student to be aware of what they do not understand and why, this must be the responsibility of the teacher (cf. Laurillard, 2002; Selwyn, 2014; 2016). An objection could here be made that Networked Learning is a concept that extends beyond school into a lifelong learning enterprise which will not always include a teacher. However, I would argue that the notion of a lifelong learner complies better with the image of a person who continuously covers more and more content knowledge in a growing number of domains throughout his or her life, than with the image of a person who effectively masters a few supposedly general basic skills such as 'problem-solving', 'critical thinking' and 'autonomy' and is then believed to be ready for any and all of life's challenges.

In addition to epistemological and pedagogical problems, the learner-centric tradition also carries with it an individualistic ideological luggage which stands in strong contrast to the overall agenda of Networked Learning as stated by its current general description:

> Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies (NLEC, 2021a).

While it is important to avoid repeating the mistake of Hegel and Marx who, according to Peters in their "collectivist, holistic approach to social phenomena tended to go to the other extreme of ignoring the importance of individual centres of experience" (1966, p. 49-50), it is equally important to remember that the notion of democracy only has meaning to humans as collectives and is irrelevant to isolated individuals. A recurring word in the recent discussion about how to redefine Networked Learning is ‘emancipation’ (NLEC, 2021a; 2021b), which stands for one of many of NL's, in my opinion, noble ideals because it acknowledges the beauty of education and knowledge when they are valued for their own sake rather than as an economic investment or just a means to some other practical end. However, in the backwaters of a misconstrued romanticist notion of nature as more pure, more real and altogether better than culture, emancipation has come to mean something else in learner-centred lines of thought. Educational emancipation has come to be interpreted as liberation from centralized regulation and from demands of conformity to the common, rather than liberation from the shackles of ignorance and an invitation to join the intellectual conversation of society. The concept of Networked Learning carries in it the acknowledgement that the power of knowledge derives from the very fact that it is shared and agreed upon by a community in which it is validated by some shared frame of reference. When knowledge becomes individualized and knowledge production is distributed and privatized, it unfortunately becomes diluted, which deprives it of much of its value and strength, and consequently its emancipatory power.

In learner-centred thinking on the other hand, an emancipated student is a self-driven student, independent from the teacher and seemingly any social obligation. The ideal of education is that it is 'customized' or 'personalized' to suit any individual preference and this whole discourse is paradoxically euphemized as 'democratic education'. This individualistic view is certainly prominent in Dewey's ***Democracy and Education*** (2016/2018) where he strictly separates the individual from the centralized social institution and relates the two with words like

'obedience' and 'submission', which have obvious negative connotations. In more recent times this capitalist line of thought has become especially associated with technology's role in education and society (Eldred, 1995/2015; Selwyn, 2014; 2016).

It is high time that the creed of democratic education is reclaimed from this distorted conceptualisation. Educating to let the individual know that they are part of something larger than themselves is certainly no less democratic than educating to create self-centred individuals who understand the world only from their own limited personal perspective and who is driven by a competitive neo-liberal motive rather than the notion of a socially shared challenge and the associated social responsibility which is the intention of Networked Learning.

Final Remarks

I am aware that the educational tradition I am advocating has long been accused of being conservative and elitist, for reproducing the past rather than inventing the future, and oftentimes has the whole enterprise of formal education been contaminated by this bad reputation because of it. To some this may not resonate well at all with the Networked Learning ideal, since this perspective pictures the university rather like an Ivory Tower, the very image which the network model hopes to replace (Toft Nørgård et al., 2019). But paradoxically, such discourse neglects the fact that one of the main purposes – if not the main purpose – of organized formal education is to do precisely that: to preserve what humanity holds to be culturally valuable, to pass on what we have come to know over the ages and how we learned it, which includes our greatest discoveries as well as our gravest mistakes, because that knowledge is a necessity for the next generation to be able to improve upon our culture, as Peters had already realized some seventy years ago:

> In recent times it has been fashionable to attack the old view, associated with the moulding model, that education is concerned with the transmission of a body of knowledge. Stress is placed instead on critical thinking, individual exploration and experimentation. This emphasis was salutary enough at a time when bodies of knowledge were often handed on as 'inert ideas' and without any attempt being made to hand on also the public procedures by means of which they had been accumulated and could be criticized and revised. But it is equally absurd to think that procedures can be handed on without content. Critical thought is vacuous without anything concrete to be critical about and there are as many brands of 'critical thinking' as there are disciplines. In the various modes of thought such as science, history and philosophy there is a great deal to be known before the peculiar nature of the problem can be grasped. The procedures of a discipline can only be mastered by an exploration of its established content under the guidance of one who has already been initiated. (Peters, 1966, p. 53-54).

Perhaps an information age needs an information authority. In a time of alternative facts, deep fakes and all sorts of disinformation spreading, a sturdy and trustworthy centralized Ivory Tower, connecting the networked nodes of society, is perhaps just what people need and expect the university to be.

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Activity Centred Signature Pedagogies for the Creation of Digital Educational Publications

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Abstract

In this paper, we draw together three sets of ideas to create a framework for understanding and improving the networked creation of digital educational artefacts. We combine ideas on learning networks and networked learning, activity-centred analysis and design (ACAD) and signature pedagogies. Focusing on establishing a framework for understanding the network practices, the participation of people from different professions and the nature of learning in doing, the paper explores the possibility of constructing a framework that can be customised to the needs of specific professions or of industry-specific multi-professional networks. The case on which we focus, and which we use to inform, illustrate and sharpen some of the argument, is that of digital educational publishing – specifically, the activity of the educational publishing company Systime. However, we see the framework as applicable to a much more extensive range of situations. Consequently, the paper contributes to wider theoretical and practical work on the creation of digital educational artefacts. It also contributes to thinking more deeply about assumptions and practices involved in professional knowledge-building networks: especially where participants develop what we describe as a 'reflexive designerly disposition', capable of improving what a network achieves and how it functions.

Keywords

Signature pedagogies, Design for learning, Activity-centred analysis and design, Networked learning, Design of digital educational publications

Introduction

Networked learning is a field of research and practice that pays particular attention to learning in doing, especially in circumstances where people are learning through collaborative engagement in jointly valued activities and where digital communication technologies play a significant part in their work (Networked Learning Editorial Collective (NLEC), 2020). In the case we examine, high school teachers are working as authors of digital educational books. They collaborate with specialists who are employed by the leading Danish educational publishing company Systime to provide services and support in various areas of digital publishing. The teacher-authors typically come into this work without any training in publishing or educational design. They learn to become authors by authoring, in interaction with a network of other people, engaged together in creating digital educational books and making them available to Danish schools.

One practical goal of our work is to see how these teacher-authors might be helped to become better at what they do: to find ways of working that are reflective, efficient and enjoyable. A complicating but positive feature of our case is that when teacher-authors get better at what they do, implications can flow in several directions. As they become more familiar with, and more capable at, design for learning, beneficial effects may be felt by the teacher-authors themselves, seen in the digital books they produce, and registered in the broader networks of people, artefacts and processes creating and using digital educational books.

The paper falls into three main sections. Firstly, we provide some detail about the empirical case at hand. We describe some of the messiness and complexities that characterize the creation of digital educational publications. We sketch relevant network practices, the participation of people from different professions and the nature of learning in doing. We use the ACAD framework to help distinguish between different kinds of design components involved in networked learning – epistemic, set and social – and between what is designable and what emerges in the unfolding activities of learning networks (Goodyear et al., 2021). The second main section introduces the concept of signature pedagogy (Gardner & Shulman, 2005; Shulman, 2005; Stables, 2020) and explains how we use this particular approach to construct a framework that can be customised to the needs of specific professions or of industry-specific multi-professional networks. Signature pedagogy usually focuses on how practitioners within a particular profession are introduced to, and enculturated into, their profession (Canals & Mor, 2020; Chick et al., 2012). In the final section, we outline a framework for combining different signature pedagogies to understand and improve learning and development opportunities for teacher-authors in multi-professional educational publishing networks.

Through this, the paper contributes to the networked learning literature in the following ways. Firstly, it offers a theory-based framework which can be used to articulate the assumptions and practices involved in the networked professional formation of creators of digital educational artefacts, such as digital textbooks. We see this as a necessary advance on the use of highly generic theories and decontextualized concepts that are the norm in 'onboarding' and 'upskilling' new participants in fields like this. In essence, we are advancing the case for a distinct signature pedagogy for teacher-authors' design of subject-specific digital educational publications. Secondly, and perhaps paradoxically, the paper shows how a framework developed for a specific networked industry can be used as a resource for analysis and design in other fields: through similar reasoning and the transformation of one specific framework into another specific framework. It shows how close pragmatic analysis of how a business's productive networks actually function can be used to guide improvements to processes, relationships and outcomes, including by putting pedagogical expertise, learning theory and design in the limelight.

Case introduction: networks and network practices in the creation of digital educational publications

Core concepts and methods

The notion of 'network' foregrounds *connections* between people, ideas, activities and resources across time, space and media (Carvalho & Goodyear, 2014; Goodyear et al., 2021; Öztok, 2021). A learning network simultaneously situates, and is constructed by, the social activities of people who are learning something of significance to them. In this paper, we focus on situations where a network of people – mainly teacher-authors and publishing professionals – work together towards the goal of producing digital educational publications that potentially support other teachers' designs for their students' learning. The case and empirical data on which this article is based is part of an ongoing project, namely the PhD project of the first author, focusing on investigating and redesigning the publishing framework offered to teacher-authors of digital educational publications. In Bülow & Nørgård (2021) Systime, and the design space they offer to teacher-authors, were analysed as a potential collaborative space for networked learning. The current article extends this work by developing a framework for understanding and supporting the roles, processes and networks teacher-authors enter into when creating digital educational publications in a publishing company such as Systime.

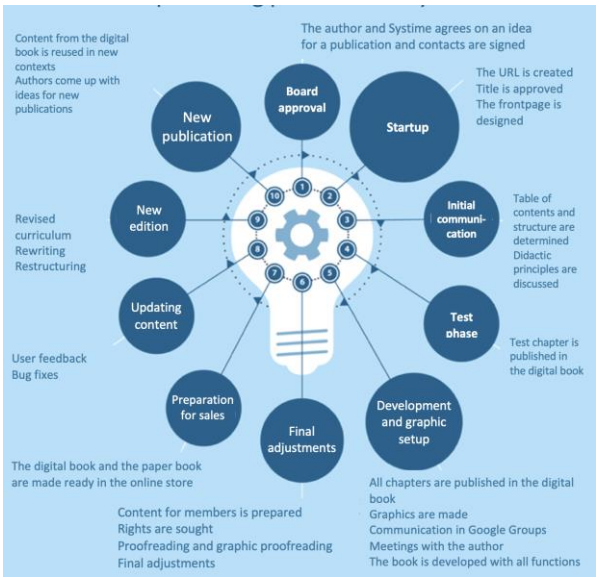
Here, the analysis draws on multiple sources of data collected over a period of two years (2019-2021). This includes 1) *Observations:* Networked practices were observed in real time in three delimited publishing processes. Both physical and online meetings involving teacher-authors were observed and recorded. 2) *Interviews:* November 5th, 2021, 49 teacher-authors in 11 groups participated in semi-structured group interviews. Each group spent 30 minutes in dialogue describing the networked practices that defined each stage of their publishing processes. Subsequently, they video documented 8-10 minutes of reflection on similarities and differences in their experiences. These recordings were later analysed to map networked practices. 3) *Participant workshops:* 18 hours of video recordings have been segmented and analysed. Inspired by Iivari (2018) and Carvalho et al. (2021), participant interpretation techniques were used to position the participants as co-interpreters: constructing meaning in their own activities and for the interpretations of these activities (Carvalho et al., 2021; Iivari, 2018). Through analysing participants' reasons for collaboration, the role-taking and the competences needed in collaboration, we have also been able to map digital, physical and hybrid spaces, seeing where connections and tools are supporting valued activities - and where they make things more difficult.

Systime Case Study

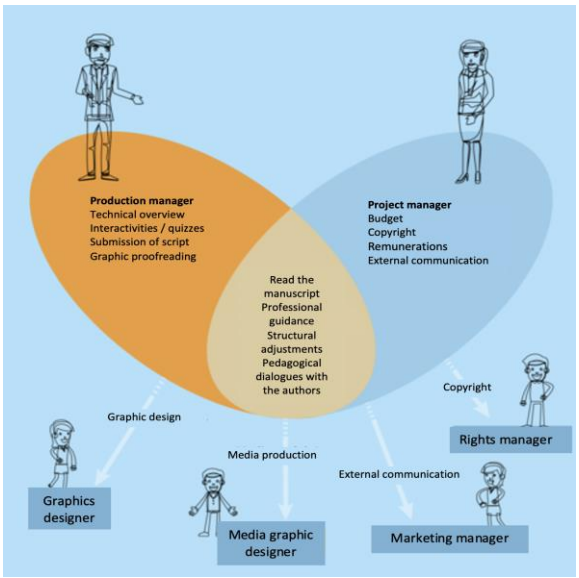
As part of the oldest and largest publishing company in Denmark, Gyldendal Group, Systime is a leading supplier of educational materials to K-12 students and teachers in Denmark, Greenland and the Faroe Islands. The majority of Systime's publications are digital and they are distributed either as single publications, as subject packages or via a subscription scheme that gives students and staff access to the publisher's total library of more than 550 digital publications. From its birth, Systime has had a distinctive 'take' on the publishing business (Freytag & Philipsen, 2019). The author's influence in editorial processes is considered crucial. Editors work as project managers rather than content experts. Also, the company saw itself as one of the first publishers to try out digital publication formats (Riis Ebbesen, 2016). Systime considers itself a frontrunner with both the digitalisation of educational publishing and the involvement of end users. The company's vision statement underscores the importance of the relationships between teacher-authors and the different user groups - students and teachers:

> Being 'The Collaborating Publisher', our goal is to develop our publications in collaboration with the teachers and students who use our materials. We believe the publications will be better when users help to shape them. Partnership, networking and user involvement are therefore key elements in our work. At Systime, we do not consider a publication as a finished product, we see it as a dynamic and ongoing process - a common meeting place for users and authors. Our most important role as a publisher today is to build and nurture vibrant communities of authors and their users so that publications are constantly developing and improving. Learning and development is no longer an individual matter; it is a social act. (Systime, 2021)

Figure 1 can also be found included on the official company website. It is aimed at informing future authors about the publication processes and according to the accompanying text the processes are to be understood as a so-called 'open publishing process', where future users (colleagues or students) are invited to comment on the developed materials, before the official release. The website also provides a description of the people and roles associated with each of the ten steps in the process. The ways in which the publisher expects the collaboration between the teacher-author and the in-house design team – the project manager, the graphic designer, the production manager, and others – are explained with examples and advice regarding not only the digital collaboration and production platforms, but also the teacher-author's role in marketing and editing.



1a: The publication process: tasks as they are perceived from the project manager's perspective



1b: A graphical representation illustrating the different roles of the in-house design team

Figure 1: The publication process and the roles involved

During the conducted fieldwork, it became clear that each publishing project follows a unique path from first idea to final publication. All parties show great diversity in the ways they incorporate the available communication and production tools. Depending on the type of publication (for example, a publication with extensive interactive

multimodal content), the teacher-authors collaborate with the publisher's internal staff in different, but still predominantly path-dependent, ways (Carvalho & Yeoman, 2019, p. 1112). The typical duration of a successful publication process is between 1 and 3 years: a relatively long period of collaboration and co-creation in networks with highly adaptable configurations. Both the authors and the external editors are in most cases practicing K-12 teachers who have chosen to spend some of their spare time on creating teaching materials. They are initially not paid for this work. In most cases, remuneration only occurs when (and if) the publication is used in the schools that subscribe to Systime's digital library.

Networks, networking practices and ACAD

The unfamiliar context of a publishing company challenges the teachers' practical and theoretical knowledge. The methods and routines they have developed for preparing for classroom teaching cannot be transferred directly to the process of authoring digital publications. Becoming a teacher-author is a learning process and it is supervised by a group of professionals playing distinctive and essential roles. The project manager and the external editor must acknowledge – and preferably activate – the teacher-author's 'teacher knowledge', but at the same time they must help form a safe and productive learning space in which the teachers can experiment and iteratively improve the educational materials they create, and the methods they use. Designing for networked learning involves much more than formulating tasks and instructions. It also includes consideration of how social and physical elements contribute to the functioning of a productive learning network. These social and physical elements can also provide new possibilities and impose new limitations in the process of designing digital educational materials.

We use the Activity-Centred Analysis and Design (ACAD) framework (Carvalho & Goodyear, 2014; Carvalho & Yeoman, 2021; Goodyear et al., 2021) to scaffold reasoning about the functioning and improvement of specific sets of learning arrangements. This operates at two levels. In order to understand the teacher-authors' work, when they are designing for other people's teaching and learning, we acknowledge that they face a difficult task of anticipating intended outcomes while designing for emerging learning activities to be engaged by unknown others (ACAD's principle of indirection (Goodyear & Dimitriadis, 2013)). Also, we can use ACAD to distinguish between three different kinds of designable components from which the teacher-authors' learning networks are created: set design, epistemic design and social design. All of these are open to alteration through interventions by project managers and teacher-authors:

- The social design accounts for roles and the division of labour in a network; the distribution of work across individuals and teams, peer and cross-functional collaboration, etc.
- The set design includes digital and physical technologies and spaces. The character of a learning network develops over time, and this evolution is often visible in the changing use of technologies for communication and production.
- The epistemic design describes the typical tasks that the in-house design team will tackle (e.g., the project manager and teacher-author in collaboration with graphic designers, production managers and others).

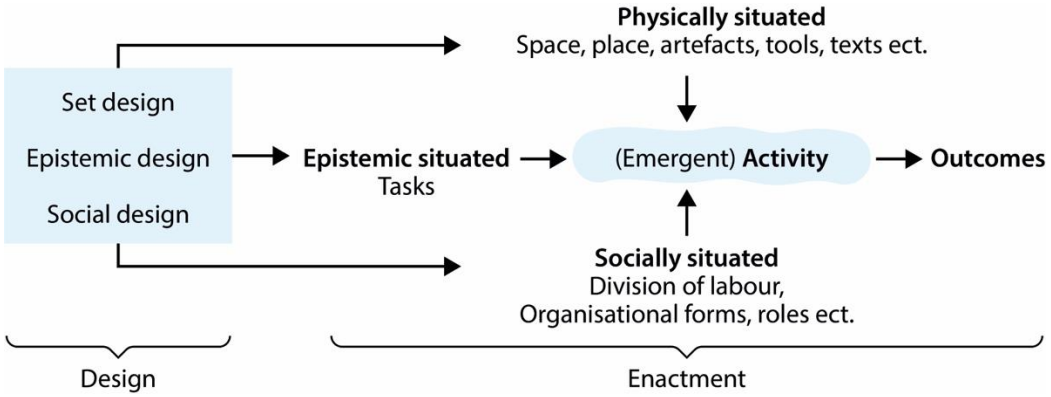


Figure 2: The Activity-Centred Analysis and Design (ACAD) framework (Muñoz-Cristóbal et al., 2018)

The Systime publication process typically differs on all three design dimensions, from the contexts and routines that teachers associate with designing for students' learning in day-to-day teaching. The process also progresses in a significantly different way. This evolution can be analytically divided into three different stages with distinctive design configurations and intended outcomes. In contrast to the 'steps' illustrated in Figure 1, the

analysis illustrated in Table 1 is based on the concepts of social, set and epistemic design – structured temporally in relation to the expected outcomes from the different phases.

	Social design	**Set design**	**Epistemic design**
1: From initial project idea to acceptance of book proposal	The teacher is not yet formally working with the publishing company. The primary activity takes place in school-contexts or in other informal teaching professional networks.	Contact is established between author and publishing company through the publisher's website. Communication with the publisher takes place via email or phone. Set design is primarily the future author's school (workplace) and private home with physical/digital resources (e.g., local LMS).	Sketching the project idea and synopsis First contact between the publisher and the future teacher-author is not epistemically scaffolded.
2: From acceptance to the point where the author(s) finalize the written parts of the manuscript	The teacher-author has entered into a formal contract for publication. Digital collaboration spaces established, supplemented by physical and synchronous online meetings.	The writing is situated in the teacher-author's private home or at the school of employment. Digital tools like Office365/Google Workspace are used to write the manuscript. Testing materials with students is done through the local LMS.	Writing texts, developing suggestions for assignments, activities, etc. Pedagogical reflections between authors / author and external editor.
3: Digitalization, editing and production of interactive and multimodal content	Depending on the character of the process and type of publication the teacher-author participate in both formal and informal communities of practice onsite and online.	A subject-related digital resource ecology that contains both definite subject specific software and the use of generic technologies as cognitive partners and means for production of various graphical or epistemic designs.	In collaboration with publishing professionals, teacher-author prepares teaching videos, podcasts, lecture plans and adaptive formats.

Table 1: Collaboration, resources and tasks as they are perceived from the teacher-author perspective

A call for professional development

Table 1 offers a simplified picture of the countless ways in which publishing projects are realized (or abandoned) in a changing interplay between productive networks and networking practices. Using the ACAD framework to understand the current challenges, it became clear during the fieldwork, and through conversations with teacher-authors and other members of publishing project teams, that the work of a teacher-author involves several paradoxes – and they all seem to be related to the networking practices analysed above:

- **The social design paradox**: The publisher's aspiration to "build and nurture vibrant communities of authors and their users" is not seen by the teacher-authors as well-facilitated, organizationally or technologically. The tasks that teacher-authors and editors are given rarely include 'community-building'. The publisher's vision of making learning and development a social act is – according to some teacher-authors – seen as contradicted by the fact that there is a lack of support and communication for long periods, especially in phase 2.
- **The set design paradox**: Digital spaces are being created, but according to the authors, they are (too) rarely used for establishing collaborative design spaces or productive learning networks - within the project as well as with other authors. For example, teacher-authors request better opportunities to improve their draft texts and activities, through real-world online trials.
- **The epistemic design paradox**: According to some of the interviewed teacher-authors and project managers, the publisher's vision of making innovative materials of a high professional and pedagogical standard (Systime, 2021) is contradicted by the fact that there is limited subject-specific knowledge about, or ongoing schooling in, methods for designing good digital teaching materials.

The described challenges for teachers to transform themselves into authors and designers of digital educational publications, as well as the identified paradoxes within the publishing company, together create barriers for the development of well-designed digital educational publications. Publishing companies, such as Systime, need to nurture and scaffold the *profession of teacher-authors* from entry level (teacher as first-time author and designer of digital educational publications) to skilled level (teacher as experienced author and designer of digital educational publications).

For publishing companies to facilitate such an enculturation of teachers within a certain profession (e.g., Mathematics) into a new profession (e.g., authoring and designing digital educational publications for teaching Mathematics) requires that the publishing company has the capacity and competence to establish, integrate and develop this new profession within the teacher's existing profession. To achieve this, the publishing company needs to be able to distinguish between and design for four distinct *profession spheres*:

1. The native profession sphere: The teacher's native profession of teaching a subject in the classroom – and the ability to think, act and have an identity as a teacher within that profession.
2. The new profession sphere: The teacher's new profession of authoring and designing digital educational materials for teachers within a profession and in collaboration with a publishing company – and the ability to think, act and have an identity as an author-designer within that profession.
3. The relational profession sphere: The teacher's ability to interlink native and new profession in such a way that subject knowledge from the native profession is delivered in the form of a well-designed digital educational publication using the new profession – through the ability to think, act and have an identity as teacher-author by drawing simultaneously on both professions.
4. The maturing profession sphere: The supported professional development of an identity within the interlinked profession through incremental, iterative, networked and repeated experience transforming the teacher-author from novice to veteran teacher-author, capable of contributing to the improvement of professional practices.

To support publishing companies in designing for and offering such teacher-author networks, spaces and processes, the next section introduces a reworking of the 'signature pedagogies' framework.

A signature pedagogy framework for the profession of teacher-authors

The signature pedagogy framework: hand, head and heart; surface, deep and implicit structure

Signature pedagogy was introduced to a broad readership by Lee S. Shulman in the seminal article: 'Signature pedagogies in the professions' (Shulman, 2005). The core idea of signature pedagogies comes from research into the different ways in which universities prepare students for specific professions (Gurung et al., 2009; Shulman, 2005). Shulman and colleagues argued that while there are broad pedagogical patterns horizontally cutting across the disciplines (e.g., lecture hall presentations), there is also a distinct 'signature' patterning a particular profession (e.g., the studio 'crit' practice of design or the exegesis of texts in theology). As Thomson et al. (2012) put it, there is something as distinctive as a handwritten signature about the characteristic pedagogy when educating for a profession (Thomson et al., 2012).

These patterns that together constitute a certain signature pedagogy of a profession comprise the particular ways of thinking, doing and being characterising the profession: "… novices are instructed in critical aspects of three fundamental dimensions of professional work – to think, to perform, and to act with integrity" (Shulman, 2005, p. 52). Shulman refers to these as "habits of the head, habits of the heart, and habits of the hand" (Shulman, 2005, p. 59). According to Shulman, signature pedagogies are holistic as they bring head, heart and hand together within a deep vertical structure organised in three dimensions:

> First, it has a surface structure, which consists of concrete operational acts of teaching and learning […] Any signature pedagogy also has a deep structure, a set of assumptions about how best to impart a certain body of knowledge and know-how. And it has an implicit structure, a moral dimension that comprises a set of beliefs about professional attitudes, values, and dispositions. (Shulman, 2005, pp. 54–55)

	Habits of the head	Habits of the heart	Habits of the hand
Surface structure	Body of knowledge	Identity traits	Repertoire of actions
Deep structure	The profession as a certain way of thinking	The profession as a certain way of acting	The profession as a certain way of performing
Implicit structure	Embodied dispositions	Embodied attitudes	Embodied habits

Table 2: Surface, deep and implicit structures

Combined, the signature pedagogy framework encapsulates the ways a person is enculturated in three areas of the professional work involved. There are 'thinking as a professional,' 'acting as a professional' and 'performing as a professional' (Hobley, 2021).

Applying signature pedagogy to the case at hand: Vertical, horizontal and diagonal signature pedagogies

Through a reworking of the signature pedagogies framework, that takes into account the three paradoxes identified through the ACAD framework and the four distinct profession spheres, publishing companies like Systime can be aided in supporting and designing for teachers to become teacher-authors. Originally, signature pedagogies capture the essence of thinking, performing and acting within a profession, e.g., teaching Geography or History in a classroom. This deep or 'vertical' signature pedagogy is the professional habits of the head, hand and heart that teachers enter the publishing company with and use to create the content of digital educational publications. Multiple examples of such 'vertical' signature pedagogies can be found in Gurung et al. (2009) *Exploring signature pedagogies* – e.g., signature pedagogies for Literature studies, Geography or Agriculture (Gurung et al., 2009).

However, upon entering the publishing company, teachers, no matter what profession they are educated in, are faced with a new profession, that of creating well-designed digital educational publications. This new 'horizontal' signature pedagogy cutting across the teachers' native 'vertical' signature pedagogies needs to be facilitated by the publishing company so that teachers can fuse their 'vertical' habits of the head, hand and heart with the habits of head, hand and heart of this new 'horizontal' signature profession. That is, the publishing company needs to enculturate and support teachers in establishing a new practice within their existing profession through creating strong and reflective interlinkages between the vertical and horizontal profession. Such examples of a 'horizontal' signature pedagogy, cutting across the professions, can be found in Julia Horn's description of the Oxford tutorial system (Horn, 2013) or in Tünde Varge-Atkins article on disciplinary digital capabilities as the interlinking of discipline-specific vertical signature pedagogies with cross-disciplinary horizontal digital capabilities (Varga-Atkins, 2020)

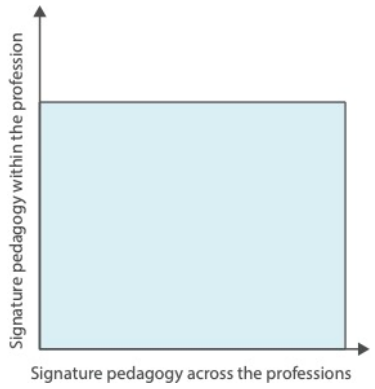


Figure 3: Vertical and horizontal signature pedagogy

Figure 4: Vertical and horizontal signature pedagogy distinguishing the professions of teacher-authors

Figure 3 illustrates the two axes of vertical signature pedagogy within a discipline-specific profession and horizontal signature pedagogy cutting across the professions. In the context of teacher-authors creating digital educational publications with publishing companies such as Systime, figure 4 illustrates the dual role of the teacher-authors. They enter Systime with their subject knowledge as teachers and are faced with a new signature pedagogy requiring a designerly disposition towards designing digital educational publications.

Below, the distinction between teacher-authors expanding their native profession sphere (figure 5a), publishing professionals expanding their native profession sphere (figure 5b) and teacher-authors acquiring a relational profession sphere by interlinking and expanding both native and new profession sphere (figure 5c) is illustrated. As shown, teacher-authors initially have a narrow horizontal signature pedagogy which implies that the teacher-author has limited knowledge in designing digital educational publications, yet has knowledge concerning the taught subject (figure 5a). In contrast, the in-house design team at the publishing company holds a broader horizontal signature pedagogy with knowledge in designing digital educational publications, however they often have limited knowledge of the taught subject (figure 5b). Finally, the enculturation of teacher-authors into the profession of designing digital educational publications brings about a diagonal expansion where the teacher-author gains knowledge along both the vertical and horizontal axis (figure 5c).

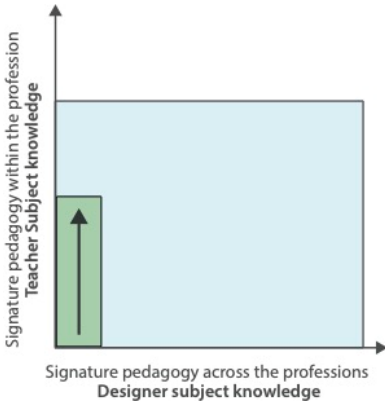


Figure 5a: Teacher-author with some subject knowledge in Math and with limited subject knowledge in designing digital educational publications

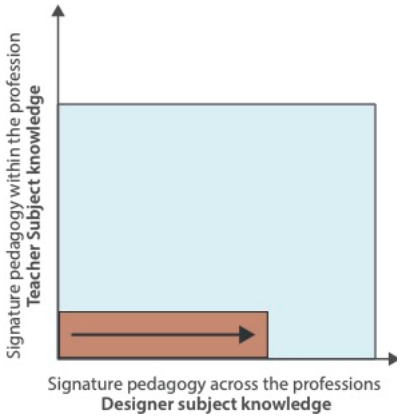


Figure 5b: In-house design team with some subject knowledge in designing digital educational publications and with limited subject knowledge in Math

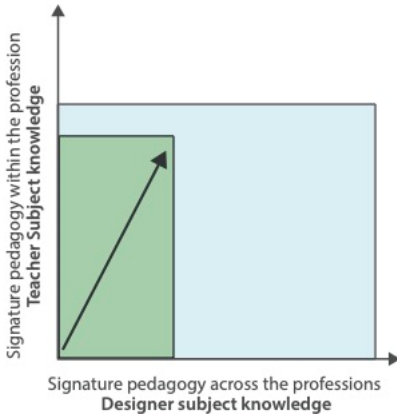


Figure 5c: Teacher-author with growing subject knowledge in Math and with growing subject knowledge in designing digital educational publications

This implies that publishing companies with the ambition of supporting teacher-authors in creating well-designed materials must develop and implement frameworks and processes that take into account and create reflective connections between vertical and horizontal signature pedagogies (ACAD design space). Thus, the publishing company must offer a situated signature pedagogy that supports teacher-authors in creating connections between the vertical and horizontal axis. It furthermore suggests that publishing companies should position themselves as networking 'design collaboratoriums' (Bødker & Buur, 2002; Bülow & Nørgård, 2021) wherein both teacher-authors and publishing professionals enact and develop progressively more advanced and deep practices for designing digital educational materials (ACAD enactment space). A design collaboratorium is a design space that supports and promotes mutli-professional design teams in aquiring designerly dispositions through collaboration and joint action. In this way, a design collaboratorium is a distinctive type of space that is particularly suited to facilitate networked design practices.

In the context of teachers with one professional identity that have to be enculturated into a new professional identity, this is especially complex. Because many teachers-to-become-authors occupy a full-time job within their profession, enculturation of teachers into becoming designers of digital educational publications entails complexities not associated with teaching a subject in a classroom. Teachers must be both professional practitioners of a subject (vertical signature pedagogy) while simultaneously engaging in complex learning networks and processes of educational design (horizontal signature pedagogy). This, in a way, entails a specialisation or expertise within their field while entering as a novice into a new learning network and community. To enable this, they need support from the publishing company in connecting and merging the hand, head and heart of their subject domain with the hand, head and heart of designing educational publications. This creates professional challenges on both the vertical and horizontal axis as teacher-authors integrate the signature pedagogy of their subject into the signature pedagogy of being a designer of educational materials.

This calls, in turn, for publishing companies to develop ways of scaffolding and promoting these complex connections. Furthermore, it also highlights the need for competency development of the publishing companies themselves: to progress from positioning 'teachers as individual textbook authors' to supporting 'teacher-authors as collaborators in the design of digital educational publications.' Here, attention to the diversity of roles, expertise and capabilities is crucial if publishing companies wish to develop the capacity and culture of these new and evolving professional practices. In the last section of the paper, we combine the above ideas from networked learning, ACAD and signature pedagogies into a composite framework for publishing companies to move towards this goal.

A composite framework for publishing companies to support teachers in becoming authors and designers of digital educational materials

The idea of expanding diagonal signature pedagogies for publishing companies supporting teachers in becoming (better) designers of digital educational publications can be elaborated through juxtaposing the following frameworks.

Prestructural framework (PF): The absence of horizontal design and enactment space within the publishing company. Teachers are more or less 'left to their own devices' and write a manuscript based on their native signature pedagogy, transforming its habits of head, hand and heart into text. Here, no distinction is made between professional starting points. No matter what vertical profession identity a person brings with him or her into the profession as a future author of educational publications, the same repertoire of educational and general learning theoretical assumptions will be at play.

Unistructural framework (UF): The publishing company offers tools, how-to scripts, technical support and in-house design and layout to teachers writing a manuscript. While staff within the publishing company might have an advanced understanding of the horizontal design and enactment space, teachers only engage the surface layer of the horizontal signature pedagogy. This, in effect, creates a decoupling between the teacher's vertical signature pedagogy and the publishing company's horizontal signature pedagogy. In other words, the publishing company prepares the teacher to become an author through a 'toolbox approach' offering technical solutions, technological possibilities and how-to guides that provide the author with new concrete or technical knowledge, skills and competencies. However, this does not create a strong interlinking between the vertical and horizontal axis or scaffold the formation of a designerly disposition in the teacher-author.

Relational framework (RF): The publishing company has an enactment space in place for the individual teacher-author that scaffolds the interlinking of vertical and horizontal axis in order for the teacher to, over time, develop a holistic identity as teacher-author. That is, the publishing company's enactment space serves as the teacher-author's design space, when designing digital educational materials. The relational framework is author-centred, focusing on professional development of the individual teacher to be transformed into a teacher-author with designerly ways of thinking, doing and being. Through the fusion of vertical and horizontal signature pedagogies a composite professional identity and reflective designerly disposition is developed. This, in turn, presupposes a substantial professionalization of the practices associated with becoming a teacher-author. This might be achieved through individual training as well as collaboration and meetings between teacher-author and publishing professionals.

Networking framework (NF): The publishing company has in place an enactment space that functions as a collaborative learning network, design collaboratorium or community of practice. Here, the interlinking of vertical and horizontal axis happens through multi-professional design teams or networks where e.g., teacher-authors, subject experts, learning designers, publishing professionals and others work together around the creation of digital educational publications. That is, the publishing company's enactment space serves as a networked design collaboratorium focused on getting people to work together to create well-designed digital educational publications. The networking framework is community-centred, focusing on professional development of the collective as a teacher-author network with a reflective designerly disposition through the interlinking of the various vertical and horizontal signature pedagogies present within the network. This might be achieved through joint peer-review processes, round table discussions, collaborative design experimentation, participatory design workshops and peer-to-peer learning. The individual teacher-author's networked and situated professional development thus takes place within a collaborative professional community (which are maintained as hybrid learning networks) (Bülow, 2022; Nørgård & Hilli, 2022).

	Prestructural framework (PF)	Unistructural framework (UF)	Relational framework (RF)	Networking framework (NF)
The publishing company's approach	The teachers native signature pedagogy	Toolbox-focused	Author-focused	Community-focused
Scaffolding	General introduction to the publication process	Technical solutions, technological possibilities and how-to guides	Individual training as well as collaboration and meetings between teacher-author and publishing professionals	Peer-review processes, round table discussions, collaborative design experimentation, participatory design workshops etc.

Table 3: Frameworks to support teachers in becoming authors/designers of digital educational materials

We have referred to the above presented as signature pedagogies, however, a more appropriate term may be 'initial signature pedagogy' (Dawson et al., 2011), given that the framework offered here is more of a skeleton structure that can be used to intentionally and reflectively develop a signature pedagogy for publishing companies in relation to position themselves within the different frameworks (PF, UF, RF and NF) and support teachers in becoming teacher-authors with designerly dispositions. However, as we have done here, combining signature pedagogies with networked learning and the ACAD framework gives publishing companies a powerful and reflective way forward if they wish to create spaces and processes that enable teachers to become creators of well-designed digital educational publications: either as individual teacher-authors within the learning network of the publishing company (UF) or as part of a teacher-author collective that together establishes networking design collaboratoriums within and in collaboration with the publishing company (RF). This requires that the publishing company creates an internal design space where such situated signature pedagogies frameworks are developed and enacted when teachers enter the enactment space of the publishing company to take on the task of becoming teacher-authors. In doing so, the enactment space of the publishing company transforms into the teacher-authors' design space.

Through the design of digital educational publications, teacher-authors have the possibility, with the right support from the publishing company, of maturing this designerly disposition over time as they gain experience with the 'horizontal' signature pedagogy: in effect, developing a new professional capacity, that of being reflective designers of digital educational publications within their subject-specific profession. This capability can be obtained through a personalized approach, as with professional development of the individual teacher-author, or through a collective approach, by establishing collaborative teacher-author learning networks. Establishing such intentional, incremental and iterative practices within the publishing company in relation to enculturing teacher-authors into this designerly disposition can be framed as an expanding signature pedagogy that, over time and through a step-by-step sophistication of the practice, moves the teacher-author from novice to reflective designer. An example of such an expanding 'diagonal' take on signature pedagogies can be found in Stables' resent paper 'Signature pedagogies for designing' (Stables, 2020).

In figure 6a, the frameworks for situated signature pedagogies to support teacher-authors are placed into the model of vertical and horizontal signature pedagogy enabling the elaboration of a diagonal signature pedagogy framework. Examples of how such diagonal signature pedagogies within the different frameworks of supporting teacher-authors can be situated, are illustrated in figure 6b, 6c, 6d, and 6e. These juxtaposed figures illustrate the potentials of relational and networking frameworks in particular, given that they offer broader diagonal signature pedagogies through collaborative scaffolding that holds the potential to expand the 'diagonal knowledge' of the individual teacher-author or networks of teacher-authors, designers and publishing professionals.

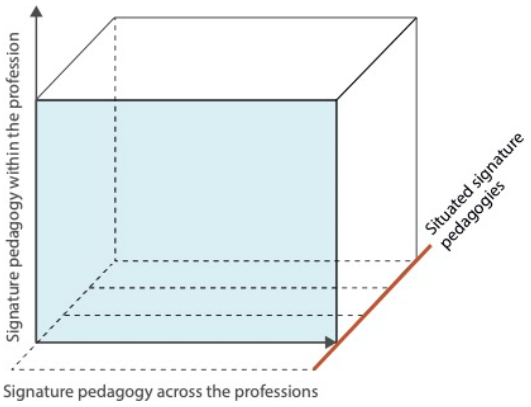


Figure 6a: Frameworks for situating signature pedagogies

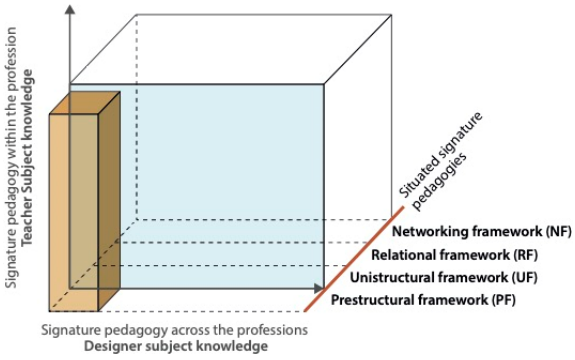


Figure 6b: Teacher-author with expert subject knowledge in Math and with limited subject knowledge in designing digital education publications (PF)

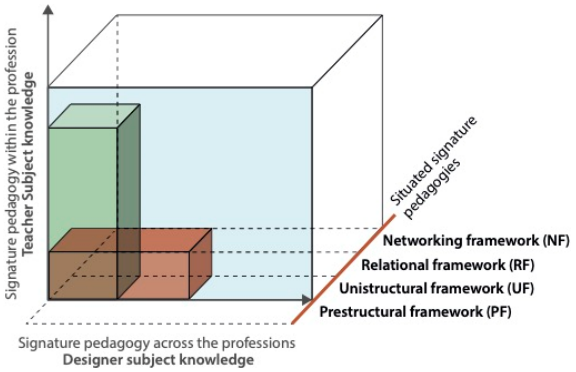


Figure 6c: Teacher-author with some subject knowledge in Math working together with the in-house design team with some subject knowledge in designing digital education publications (UF)

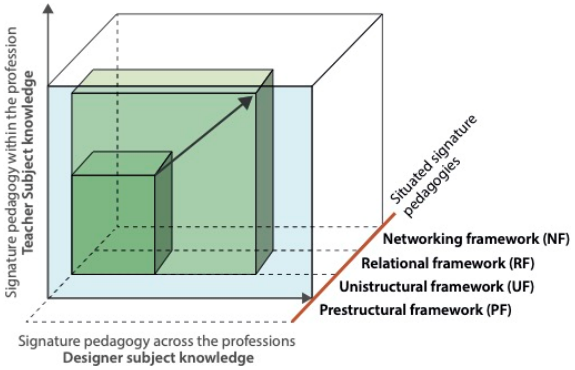


Figure 6d: Teacher-author with growing subject knowledge in Math and with growing subject knowledge in designing digital education publications (RF)

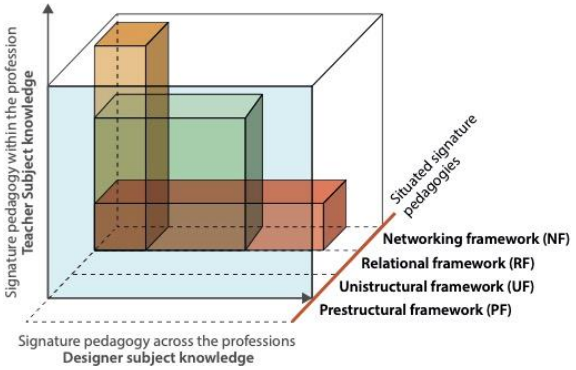


Figure 6e: Multi-professional network of people with varying levels of teacher subject knowledge and designer subject knowledge (NF)

For the publishing company to develop such an enactment and design space for the design of digital educational publications several distinct but connected development processes need to be undertaken: A) The establishment of a company design space with the set design, epistemic design and social design that will enable the creation of an enactment space for teacher-authors and the design of digital educational publications. B) The creation of an enactment space with the necessary set design, epistemic design and social design for teachers to become teacher-authors and design well-designed digital educational publications. C) Processes of enculturating teachers into a reflective designerly disposition in relation to the identified three paradoxes and four profession spheres in order to provide teacher-authors with the requisite design space and professional development (signature pedagogies). D) The identification of, on the one hand, the habits of head, hand and heart of teacher-authors, designers and other professionals involved in the design of digital educational materials, and, on the other hand, the implicit, deep, and surface structure of the processes and practices of creating well-designed digital educational materials. E) The development of horizontal signature pedagogies for the profession of (becoming) teacher-authors as well as ways of supporting the interlinking of vertical and horizontal signature pedagogies. F) The creation of an intentional diagonal signature pedagogy framework with distinct spaces, processes and learning networks for PF, UF, RF and NF, that support teachers in identifying their needs and capabilities as authors (professional development) as well as bringing about this new practice and culture of becoming teacher-authors with designerly dispositions.

Conclusion

In this paper, we have outlined, and sketched the rationale for, a framework that combines ideas about signature pedagogies with ideas about the design and functioning of professional learning networks. The framework can be

applied to enhancing the professional development of teacher-authors who are working with publishing companies to create digital educational publications. Although the framework has emerged while investigating the activities of one specific publisher, we suggest that it is potentially applicable across contexts where people who have been encultured into one profession need to link this with a new profession and collaborate in productive multi-professional networks.

Publishing companies that wish to create powerful enactment spaces and signature pedagogies for teacher-authors face expansive and complex development work. In turn, this requires capacity building and competency development in the publishing companies themselves. This article cannot provide all the answers, but it helps such companies point themselves in the right direction.

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The future of presence in distance learning, a speculative design approach

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Abstract

Face-to-face teaching remains for many teachers the golden standard in education. However, learning is always emergent, dependent on the socio-material context. Sharing a physical space is one option, but with new digital technologies, alternative assemblages can create new and exciting learning environments and experiences. Based on the community of inquiry model, I consider cognitive, social, and teaching presence as central to a valuable educational experience in higher education. The aim of this research is to look at what presence could look like in the distance university of the future.

Traditional research methods, whether quantitative or qualitative, focus on what is and on linear causal effects. However, education is open, recursive, nonlinear, and new environments introduce new actors, human and material, that affect the learning and teaching. In this research, I experiment with a speculative design method to see if it can lead to opening up new possibilities and to their critical evaluation. In six speculative design workshops, teachers developed prototypes of what presence and affective closeness could look like when students and teachers were spatially and temporally distant.

I present the three main categories of prototypes that answer the needs of distance teaching creating social interactions, offering feedback, or re-creating a virtual classroom. These all show how presence can be enacted at a distance, including asynchronously. From a science-based and data-driven approach to the Virtual Reality University, via a live course map and the connected coffee cup, each prototype offers a different view of education with its opportunities, but also challenges.

The prototypes also highlight how difficult it is to change our perception of what presence could look like in higher education. I use Bourdieu's concept of habitus to help explain the difficulty of moving away from the face-to-face experience, and how a revolutionary view rather than a marginal approach to change requires a return to the fundamental questions of how students learn, the purpose of education and the role of the teacher.

Keywords

Distance learning, online presence, speculative methods, habitus.

This research is part of the movement towards re-thinking the university of the future following the upheaval of the emergency remote teaching during the COVID-19 pandemic (PaTHES, 2021; *The Post-Pandemic University*, 2020) and focuses on the question of creating presence at a distance.

OnlineUni (name changed) is a Swiss, federally accredited distance university, with the mission to offer equal chances for adults to receive quality higher education, compatible with family or job responsibilities. Pre-pandemic, the university had a hybrid model including six in-physical presence meetings per semester. (5 classes and one examination day). With the pandemic, the university moved fully online. Student surveys and focus groups have shown that students appreciate the greater flexibility, without any significant change in marks or dropout rates (Baillifard & Martarelli, 2021). Like many universities across the world, OnlineUni is now considering the best pedagogical model going forward. A fully online programme would enable greater flexibility and access for more students. However, a survey during the summer 2020 showed that nearly 50% of teachers want to return to some form of on-campus teaching. Although the numbers may have changed as teachers moved out of an emergency situation and have adapted their modules to the new format, many still share the common belief that "only face-to-face teaching and learning can be authentic, with the power of eye contact frequently cited as emblematic of the quality mark of face-to-face interaction" (Bayne et al., 2020, p. 133).

The purpose of this paper is to see if a speculative approach can help initiate a conversation and engage the teachers in thinking about what presence could look like in a distance learning environment, with different socio-material assemblages; and to critically engage with these possible futures to understand the beliefs they are based on, the types of learning environments they would create, "the dilemmas and trade-offs between imperfect alternatives" (Dunne & Raby, 2013, p. 189). To do so, I take a speculative design approach. As Dunne & Raby write "we need to experiment with ways of developing new and distinctive worldviews that include different beliefs, values, ideals, hopes and fears from today's. If our belief systems and ideas don't change, then reality won't change either" (2013, p. 189).

In the rest of the paper, I first carry out a literature review on the role of presence in both the physical classroom and in online education. I then consider the methodology for researching the future in a complex world. In section 4, I describe the setup of the speculative design approach used in the research process, as well as the method of analysis, followed by a description of the findings. In the final discussion, I focus on the concepts of habitus and hysteresis to explain why change essentially happens at the margin and how a more fundamental transformation may be encouraged. I end with a short conclusion regarding further research.

Physical and online presence in education

In a socio-constructivist approach to learning, presence plays a central role in the educational experience. Garrison et al.(1999)'s Community of Inquiry model defines three essential types of presence: cognitive presence, social presence and teaching presence. However, there is a long-held belief that presence must be physical, the teacher and student need to be co-located for a quality education. In his seminal book *On the Internet*, Dreyfus (2001) affirms that the body is needed to understand the world, to give us a sense of reality, students need to be able to imitate their teachers; the anonymity of online activities means that there is no real commitment or risk-taking; and finally, moods are essential to creating memorable and meaningful experiences. In the preface to the second edition, Dreyfus continues "It is now clear that distance learning has failed" (2009, p. xi). With the emergency move to remote teaching, similar statements have been repeated in many teachers' and institutional discourses.

The traditional image of the teacher and student in an engaged dialogue in physical presence, such as between Socrates and Plato (350 B.C.E./1966) or Emile and his tutor (Rousseau, 1762/2009), appears as a sufficient argument that authentic quality education must be in physical presence. However, learning in universities today is far from a one-to-one dialogue, and has never been limited to the classroom, but happens in a multiplicity of spaces and through many types of activities.

As Dreyfus wrote, students learn with their bodies, from their bodies (Merriam et al., 2007), and with their emotions, both "experienced in the educational setting", and "instrumental for academic achievement" (Pekrun & Scherer, 2014, p. 1). However, this in itself does not imply the need for the physical presence of the teacher and student in the same place. The student's body is just as present and feeling in the classroom as at a distance, there is no "virtual learning", as Gourlay (2021) puts it. In online learning, emotions both positive (excitement about flexibility or interactions, satisfaction about fulfilling the course requirements, for example) and negative (anxiety, loneliness, isolation or stress regarding multiple obligations) affect the learning experience (Zembylas et al., 2008). For each statement about the need for physical presence, we could give a counterexample of what distance learning has to offer. For example, online learning does not have to be limited to controlled and efficient learning as suggested by Friesen (2011) in his analysis of a dissection app but can also be messy and involve risk-taking (Collier & Ross, 2017). Moreover, what appears as a new requirement in online teaching, can often be seen as good practice in all environments.

Presence has always been a multifaceted concept. The first definition in the Oxford English Dictionary (2021) is "the fact or condition of being present; the state of being with or in the same place as a person or thing; attendance, company, society, or association." The first part of the sentence is probably the most important in relation to higher education, as it refers to focusing on or being closely engaged with what one is doing, which does not imply other people or a shared space. The reference to being in the same place, in the second part of the definition, has, for centuries, meant sharing a physical space, but with today's technologies, space can also be virtual (e.g., cyberspace). You can be present on Zoom or in Minecraft, as you can in a meeting or on a basketball court. Moreover, presence does not always imply being visible. Often used with a possessive form, it can also mean "a person's self or embodied personality." A teacher's energetic presence may be felt on the forum. It can also refer to a person that exists, but is not seen, as in "a feeling of presence". Or finally, when referring to a sound recording, "a quality in reproduced sound that gives a listener the impression that the recorded activity is occurring in the listener's presence." Being present does not require simultaneous co-location, but what Lombard and Ditton (1997, p. 15) call the "perceptual illusion of non-mediation". All communication is mediated, for example through light, language, text, or digital technologies. As Downes (2002) notes, it is natural for the mind to engage with reality

through different media. Films, fiction, and the Internet can all offer an authentic educational experience, just as valuable, even if different, as Dreyfus' in physical presence experience. Moreover, presence can take many forms when teaching, as noted in The Manifesto for Teaching Online "a video call is contact, and so is teacher presence on a Twitter feed; a phone call is contact and so is a shared gaming session; an asynchronous text chat is contact, and so is a co-authoring session on a shared document. (…) Contact works in multiple ways" (Bayne et al., 2020, p. 144).

Attempting to compare online and on-campus education, showing that what can be done in one environment can or cannot be done in the other, would be an unfruitful exercise. Friesen himself started *The Place of the Classroom and the Space of the Screen* noting that the outcome of learning, whether online or on-campus, was the same (2011, p. 6). There is a large body of literature about the no-significant difference phenomenon between the different modes of teaching (Russell, 1999). There has always been more to a learning experience than the face-to-face encounter or even the teacher-student interaction. Architecture, technology, institutions, culture, economy, society all participate in the creation of knowledge and learning. We live in a postdigital world. Online and in physical presence are not opposites, but inextricably intertwined in our lives (Fawns, 2019). The issue is not which is superior, nor how to make up for the limitations of online learning or reproduce as closely as possible the in-person experience, but how can presence be enacted in new and different ways in a fully online environment.

Learning emerges from the socio-material interactions, retroactions, entanglements. Each teaching and learning experience is emergent and unique (Carvalho & Goodyear, 2018). And digital technologies offer new spaces for learners in which understanding and practice can unfold in new and different ways (Calder & Otrel-Cass, 2021). Presence to support learning can also be enacted in multiple ways and spaces. For example, Bayne's (2015, p. 456) teacherbot, Botty, showed how an "assemblage of teacher-student code might be pedagogically generative." Or Ash (2013) researched how technical objects such as an iPhone can be actors, generating affective atmospheres which transform our experience of space and time.

The purpose of this research is to use a speculative method to create and think critically about new ways of generating presence in an online environment. What could presence and contact in distance learning look like in the future? What are the assumptions that lie behind these propositions? What type of educational experience might they create?

Researching the future

Traditional, evidence-based approaches offer limited insights when researching the future. Biesta, in *Why 'What Works' Still Won't Work: From Evidence-Based Education to Value-Based Education* (2010), highlights three deficits to the traditional scientific approaches, the first two are particularly relevant to our purpose. First, there is a **knowledge deficit**: what we know from the past through evidence-based research does not give us any guarantee that it will continue in the future. When we carry out an experiment, we are not an external observer, but an actor in the world, intervening, changing the world, and gaining knowledge from this intervention. 'What works' is then about relationships between our actions and their consequences in an ever-changing world. Accordingly, evidence-based research cannot prescribe a course of action for the future, although it can enlighten choices to be made. The second deficit is that of **efficacy**. Education is an "open recursive semiotic system" (Biesta, 2010, p. 500) so that an action does not have a linear, deterministic consequence (required for evidence-based research), but effects are probabilistic and complex. Education systems interact with the world, an external intervention will most likely lead to more changes as the actors adapt. Finally, the system is based on the meaning and understanding given by the teachers and students. What worked in the past, may not work in the future, and will most certainly transform the world into something different from what it was.

There is no unique, predetermined world out there waiting to unfold in the future, theories and facts are not free of value or historical context (Kuhn, 1990), moreover, research itself changes the world and the participants' perception of it and researchers bring their own subjectivity. Therefore, an interpretivist epistemology in which social actors are seen as constructing their understanding of the world, negotiating its meaning in their social practices, in which meaning-making cannot be dissociated from the actors (including the researcher), and is embedded in the cultural, linguistic and historical context (Cohen et al., 2018) appears more appropriate to researching possible futures than a more traditional positivist approach.

Speculative design methods offer a way to "explore and *create* possible futures under conditions of complexity and uncertainty" (Ross, 2018, p. 197 emphasis in original) and thus offer a solution to the epistemological issues discussed above, adapted to the question at hand (Lury & Wakeford, 2012, p. 11). These are not necessarily futures to strive for, a best version that would be used to colonise the future, but a diversity of possibles to think about how things could be (Facer, 2016) and 'create spaces for discussion and debate about alternative ways of being'

(Dunne & Raby, 2013, p. 2). Design is seen as critique, it does not offer solutions, but asks questions, "challenges the way technologies enter our lives and limitations they place on people through their narrow definition of what it means to be human" (p. 34). These can help unpick hopes, dreams, fears, or concerns about new technologies, questioning underlying assumptions. Moreover, they do not leave the problem untouched, but "engage with and affect the problem it addresses" (Ross, 2017, p. 219).
A speculative approach therefore offers a valid framework for research into imagining and critically engaging with possible futures of online presence in higher education. It is not the only valid choice, traditional scientific method could help understand specific points and other approaches such as extrapolation, consensus, creative imagination or collective wisdom can and should also be used to ensure that a diversity of points of view, disciplines, and cultures are included and to offer a rich and deep palette of possibles (Gough, 2010).

The speculative design method is presented in the following section.

A speculative design method

The speculative design method follows the four steps outlined by Ross (2018):

1. **A speculative question**: What could presence and contact in distance learning look like in the future? Using a speculative design method we generate alternative futures and explore them critically.
2. **An object to think with**: to open the range of possibilities, I used a design thinking process, as defined by Stanford's d.school (*D.School Starter Kit*, 2021). In each workshop, the participants (2-4 people) started by discussing what they missed when teaching fully online, they then tried to gain a deeper understanding of the issue through empathy. They then defined the problem in a sentence before ideating. Each participant then chose one solution and developed a prototype. These objects were then shared and discussed in the group.
3. **An audience to engage with**: 13 professors and assistants, 1 faculty manager, 5 instructional designers, and 2 educational technologists took part in the six workshops on a voluntary basis. Participants came from across Switzerland (one was based in France), representing eight different fields (AI, psychology, economics, law, IT, education, engineering, and business) and three languages (French, German, and English).
4. **Capture and analyse the design decisions and responses to the object**: the workshops were recorded and transcribed. A thematic analysis was carried out on the ideation stickies, images of the prototypes and texts.

The research process followed BERA's ethical guidelines.

Although the approach was cautious compared to speculative research of practitioners with more experience such as Dunne & Raby, the workshops offered a wide range of possible representation of presence at a distance and critical discussions around what this would mean for education, as we show in the findings.

Findings: possible futures

The speculative method reached its objective of broadening the possibilities of creating presence in a distance university, as well as critically analysing their implications. The ideation process led to over 100 different ideas, nineteen were then turned into prototypes, mostly drawings, digital collages, or text. The output of the workshops can be accessed here: https://miro.com/app/board/o9J_lDE34RA=/ The Miro board includes the output from the ideation process, the prototypes, and relevant sections of the anonymised transcripts of the discussions. The prototypes respond to two main issues that the teachers considered central to their experience of distance teaching: fostering social interactions and receiving feedback. A third group of prototypes offered a more holistic approach, re-creating the on-campus experience through Virtual Reality (VR). I discuss each set of prototypes in turn.

The first group offer ways to foster **social interactions** and build trust. Some ideas are known from on campus teaching and already used in online education, such as icebreakers, peer feedback, group work, break-out rooms during videoconferences, or a social app to help find buddies. Two prototypes did not attempt to re-create the face-to-face experience but suggested new ways of creating interactions and experiencing presence at a distance, asynchronously. One prototype attempted to re-create the feeling of presence and belonging through a coffee cup that lights up when other students or teachers share messages, an implicit reference to the informal coffee breaks many faculty members said they missed. The cup offered a form of immediacy in the connection and a discreet reminder that students were not alone. The second prototype offering an asynchronous solution is the Live Course Map which focused on making students' presence in the learning process visible. The pedagogical scenario, which

is already shared with the students for each module was transformed into an electronic app to show where students are in the course, what activities and assessments they have completed, what they are working on and their progression. The scenario looks like a live map (see Figure 1), populated with the students symbolised by different coloured dots with their initials, like Harry Potter's Marauder's Map (Rowling, 1999).

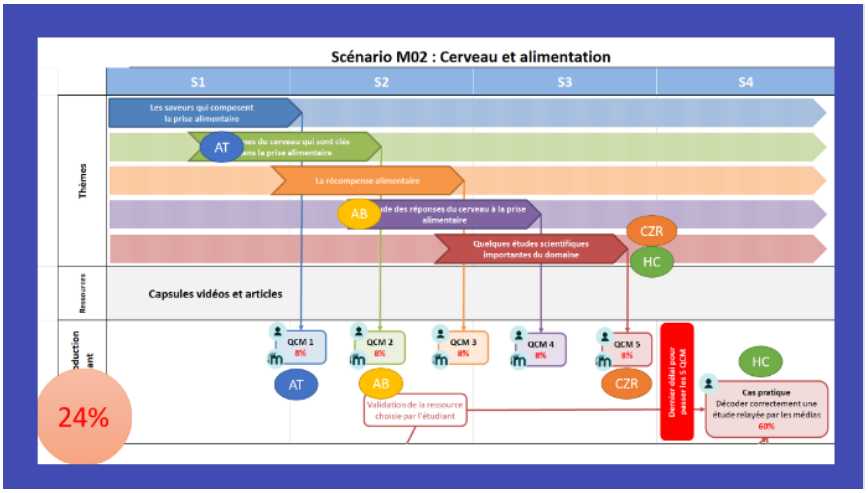

Figure 1: The Live Course Map

The different scenarios of the modules can be seen as a visual and dynamic representation of Gee's affinity spaces. Students are seen as coming together to reach a common purpose, through shared activities and discussions. The dots or avatars represent the coming and going of students with different levels of engagement (2004, pp. 70–82). The course looks alive with people active in different areas. Students could gain a more objective view of where they stand compared to others, and what is left to do. Moreover, it was hoped that this would reduce their feeling of isolation, often an issue in distance education (Zembylas et al., 2008); and increase their self-efficacy and motivation, knowing that others, like them, can do it (Ryan & Deci, 2000). In the discussion, the issues of data and privacy were brought up. It was agreed that participation should be voluntary. However, the feeling of presence and affinity space may be lessened if the dots were anonymous. What data should be considered remained open, should a student dot appear when they open a document, finish the reading, complete an activity? Should the positioning be automatic or done by the students? As with other forms of learning analytics, it is important to be transparent, avoid back boxing, and understand the meaning of the data and its limitations (Knox, 2017). As in Knox's (2017) Learning Analytics Report Card, students could be asked to choose the type of information they would like to share and receive.

One drawback of the pedagogical scenario is that it makes learning look like a race, as in a horse racing board game with the different tracks and the final exam as the goal. Workshop participants worried about the feeling of competition this could introduce, positive for some students, but not all. It also seems to imply that learning is linear, with a starting point and an endpoint, far from the messiness of the learning process, the multiple iterations it implies and its open-endedness. A rhizomatic representation or knowledge map may be more appropriate to illustrate the students' presence (Cousin, 2005).

The second set of prototypes offers different ways of **eliciting student feedback**. In all workshops, teachers mentioned missing the visual cues they received from students in presence. They considered these essential to adapt their teaching to the students' needs. One group of solutions focused on feedback during synchronous meetings and included a connected dice students could turn on their desk to send automatic feedback to the teacher on their level of understanding or wish to go faster or slower, an economics' game theory approach for a group of students to decide on whether to turn on their cameras or not, or the more traditional emojis.

For feedback in a fully asynchronous setting, three teachers suggested similar science-based and data-driven approaches. To receive feedback on the quality of the videos they would share with their students, the teachers suggested testing them in a laboratory on a group of volunteers. The students' cognitive presence would be recorded and analysed to then adapt the content and create "high-quality videos". A scientific process of data collection and analysis would be set up by a specialist in neurosciences and would include both explicit and implicit measures. Students would self-report on their emotions while watching the video, as well as on the content (understanding or optimal speed, for example). Simultaneously, psychological, neurological, and physiological

measures would also be carried out, including the analysis of facial expressions, body position, measures of blood pressure, eye-tracking, functional near-infrared spectroscopy (fNIRS) and saliva analysis. Finally, the data would be analysed using AI to indicate where the videos need to be improved. For a more detailed discussion regarding such a data-driven and evidence-based approach see Carbonel (2021, pp. 36–41). This teaching approach let to the question of the role of the teacher in such an environment. The last set of prototypes put the teacher back in the centre, as seen in Figure 2.

Figure 2: VR University 2025

The **VR University** solves the problems the teachers were meeting in distance teaching. Participants' avatars would be beamed synchronously into a common space where they could interact freely with a feeling of non-mediation. Body language and facial expressions would be visible (all current technological limitations had been lifted in the speculative approach). The teaching space has two blackboards, one for the teacher and one for the students to ask questions and vote questions up or down. Finally, a social media blocking app would be made available. Teachers could once again use eye contact and movement in the room to catch students' attention and check that they were fully present. This would create what one teacher called a 'special moment of learning' that they missed in distance teaching. The VR classroom would be a closed space over which the teacher would have control, as in the traditional on-campus classroom, at least in its idealised version. Teachers did note that they were not always able to stop students from online shopping or checking social media.

The illustration in Figure 2 puts the teacher back at the centre, with their body visible and the possibility of using gestures, moving around the room and writing on the blackboard, all elements that were mentioned as missing in distance learning. They also felt that the institutional environment would 'convey a sense of authority' and seriousness of university education, that some felt was threatened when teaching from the kitchen table. The unstructured digital space created uncertainty around the usual social rules and hierarchies.

The speculative approach created a variety of possibilities to create cognitive, social, and teaching presence at a distance, in both synchronous and asynchronous environments. The discussions highlighted the assumptions these were based on and the potential issues that may arise if they were implemented. In the next section, we discuss whether the extent to which these prototypes were able to create a new teaching and learning experience.

Discussion

The speculative method reached its objective of broadening the possibilities of representing presence in a distance education setting, as well as discussing the views about teaching and learning they are based on and the types of education they may lead to. The prototypes included measuring student's cognitive presence in high-tech laboratories, enabling the cyber-presence of both teachers and students in a VR setting, or creating asynchronous social contact through connected objects. These avoided the oversimplistic "one-would-just-need-to" solution while highlighting the complex socio-material entanglement of both human and non-human actors (Stengers, 2005, pp. 998–999). The effect of affordances (the laboratory equipment, for example) on our choices of research in education was highlighted in the data-driven and science-based prototype. The agencies of both the human and non-human are clear: the teachers and students transform the learning experience, but it is also affected by the

technological and material environment such as the teaching space (a lecture hall, the blackboard, a videoconference from the kitchen table), the presence of the body, or the apparent non-mediation of the VR technology.

However, many of the prototypes attempted to re-create the conditions of a traditional classroom online, rather than imagine an entirely new model or approach. As discussed in the second section, the value of speculative design also lies in how it leaves no one and nothing untouched, so we need to ask whether this speculative method can change the way people think and then act.

Imagination has long been recognised as grounded in the context in which it takes place, as Sartre wrote, a "melange of past impressions and recent knowledge" (Sartre, 1948/2001, p. 90). This is not a drawback but makes speculative methods valuable in understanding our world today (Law, 2004; Ross, 2017). However, to encourage participants to think differently, widen the field of possibles, and not be left unaffected by the process, we need to understand why some participants closed off alternative imaginaries.

In an experiment similar to the one in this research, although much larger in scale, Markham (2021) and her team encouraged participants to imagine alternative futures in relation to the question of memory, also using speculative methods. They too found that it was difficult for participants to imagine alternative futures. Markham's analysis of the participants' interactions shed light on a strong feeling of inevitability about the future. She explains this using the concept of discursive closure, focusing on "how certain patterns of thought, talk, actions, or interactions tend to function like negative feedback loops in social ecologies, discouraging evolution and change." Through the repetition of everyday discourses and narratives, the projected future becomes normalised and appears inevitable, the cause of these practices was forgotten, leaving just the habit.

In our research, it was the image of what teaching looked like and the embodiment of what it felt like that was difficult to move away from, rather than a feeling of technological determinism. In the Museum of Random Memory (MoRM) experiment, many participants announced that they did not understand certain technologies and therefore could not engage with them. In contrast, OnlineUni teachers, even when they did not feel they fully understood a technology and were not quite sure what it might be able to do (such as AI or VR), still suggested it as a means to create a different teaching environment.

Discourse closure helps explain the narrative around the idea that face-to-face education is the superior mode and the wish to put an end to "emergency remote teaching" to return to "normal on-campus teaching". However, there are two limits to the discourse closure approach. It does not allow for change or agency and focuses exclusively on discourse, leaving aside the embodied aspects of teaching that were a recurring theme in the workshops. The influential work by the French sociologist Bourdieu on *habitus* offers a well-researched concept that explains both the *hysteresis* of teaching methods and the agency to change (even if at the margin) while recognising the importance of the embodiment of practice.

Bourdieu's habitus consists of

> systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and representations which can be objectively 'regulated' and 'regular' without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor. (1977, p. 72)

The concept is not used here in its most common acceptance, to understand how teachers replicate social structures through teaching, but to explain how these ways of being have become ingrained through what Bourdieu calls 'le sense pratique'[2] and maintain the identity of the social academic group (Bourdieu, 1980, 1984). The habitus of teachers are dispositions such as their style of expression, dress code, positioning in the classroom, or form of teaching, which have become internalised through schooling from an early age as an embodied history. The structuring of the teacher's habitus goes back to their own experience from kindergarten and throughout their school life, often as good students. It becomes second nature, both an individual and collective identity, creating a matrix for how to behave in the academic world. This behaviour is not based on an automatic reaction, "reductible to the mechanical functioning of pre-established assemblies, 'models' or 'rôles'" (Bourdieu, 1977, p. 73). Neither is there an objective, consciously determined and deliberate action. The habitus leads teachers to certain reactions, within a range of possibles, without having to think through a response to each classroom event. In the brick-and-

[2] The logic of practice

mortar classroom, the teacher's behaviour was not automatic, but felt 'natural' and adapted easily to changing situations. When workshop participants remembered their teaching in the classroom, they felt they knew what to do and how to do it, for example when disproving prejudices, giving emotional support, or stopping side discussions in the class. The *hexis* of the body (the tendency to hold and use one's body in a certain way) was also mentioned, how the body was seen or not, being able to walk around the class, create eye contact, move one's arms, or looking down on the room. There is a teacher's way of moving their body, a "technique of the body", deeply ingrained, learned through education, and specific to the society to which they belong and their place in society (Mauss, 1934/2021, p. 54). In the classroom, the expectations are clear regarding ways of being, codes, and socialisation. When walking into a classroom, no teacher needs to be told where to stand. However, when moving to a videoconferencing platform, the teacher does not know where they are on the students' screen, or whether they are even visible and audible. They do not have a visible position of authority but are on the same level as all other participants.

The habitus offers a "structuring structure". The overall structure remains over time, but the teachers still have agency and adapt at the margin, transposing the historically successful face-to-face format online. The on-campus class is moved to a videoconferencing platform, the presentation is shared on the screen and the teacher engages in a dialogue with the students. There is a learning curve for using the technologies and setting new expectations, but most teachers were able to move their classes online, replicating the on-campus class in a virtual environment. However, many felt frustrated. Online presence in a videoconference was considered second best to in-physical presence classes. When moving from traditional teaching environments to distance learning, physical presence is no longer an implicit part of the experience, and teachers became conscious of its role in their habitus. Hysteresis meant that many teachers transposed the historically successful face-to-face format into distance learning, moving lectures online, for example. However, the habitus was no longer adapted to the new context. What made it successful, in particular the physical presence and immediacy that created and maintained engagement, interactions and motivation, were gone. Furthermore, an online lecture highlights the limits of the format, a video that can be watched when students have time, at their speed, as many times as they need, rapidly appears more appealing (Khan, 2013; Nordmann et al., 2019). Although teachers focused on the lack of physical presence, it is the whole assemblage that no longer works as it used to.
A habitus is by definition enduring, subconscious, and deeply embodied, and its transformation puts into question the whole identity of the teacher at the individual and collective level. This creates a greater barrier to change than what is often put forward such as the time and effort required to learn new technologies (Selwyn, 2017), the greater value put on an existing practice compared to an alternative that doesn't yet exist (Eidelman et al., 2009), or the difficulty in understanding new (threshold) concepts such as networked learning (Sinclair & Macleod, 2015). Increasing the duration of training or including modelling to change the teacher's habitus, as suggested by Belland (2009), is not sufficient to overcome the power of the early experiences in forming a habitus. In a study of the German teachers' habitus and the pandemic pedagogy, Blume concludes that "any attempts to address the nature of teaching and schooling in a postdigital society will require the examination of long-held and deeply situated personal and systemic beliefs" (2020, p. 896).

The COVID-19 pandemic and the forced move to remote learning created misalignment between the practice and its objective. The hysteresis of the habitus means that the teachers adapted to the change using their historical and embodied understanding of what teaching looks like and feels like. However, the new environment is too far away from the traditional classroom and changes at the margin were insufficient, leaving a gap between the opportunities that have become available, ability to take advantage of them (Bourdieu, 1980, pp. 100–104).

The current research created a space in which teachers could talk about their experience and frustrations, hear about how others transformed their teaching and encouraged them to imagine other possibilities. However, it did not focus on changing beliefs or practices. Further research is needed. One path is Markham's suggestion to carrying out multiple iterations of the same experiment, shifting 'from modes of engagement that sponsor general curiosity to more short-term actionable goals, using techniques akin to persuasion and activism' (2021, p. 400). A switch of perspective from the needs of the teacher to those of the student may bring teachers to differentiate between their needs (or habitus) and those of the student to experience a "worthwhile educational experience" (Garrison et al., 1999). Further research should include students and other stakeholders such as staff and management. With a raised awareness, research can then move towards practice and from speculation to actionable goals.

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University Teachers' Learning Experiences During Emergency-Remote-Teaching Through a Networked Learning Lens: A Phenomenography

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Abstract

This paper presents part of the preliminary findings of an investigation into higher education (HE) teachers' perceptions of personal learning networks in the context of the recent emergency-remote-teaching (ERT) scenario caused by Covid19. Technology had been increasingly permeating HE long before the pandemic, blurring the lines between online and offline spaces as students and teachers engaged across both mediums in a complex web of connections to people and online resources. The pandemic induced ERT period has magnified university teachers' use of learning networks, as many have been forced to increasingly rely on them throughout this unexpected interruption of the HE status quo. With an absence of a coherent institutionalized approach to ERT and teachers' professional development, there has been a great diversity of teachers' networked learning experiences during that period. This phenomenography, therefore, explores the perceptions of 18 Academic English instructors at a leading English-instruction university in Kazakhstan that was, like many other institutions worldwide, forced to abruptly go online. The semi-structured interviews targeted the teacher's diversified views on the benefits and challenges of network use and how these networks can be used to connect to others and online resources, using the Networked Learning lens. The present paper includes some of the preliminary findings from the ongoing research project focusing on several interlinked aspects of teachers' perceptions and experiences of networked learning during the ERT period. The results thus far show that Academic English instructors perceive the core benefits of their network use at least in four different ways as enabling flexible access to online resources, enabling flexible access to others, facilitating personalised and focussed one-to-one pedagogical interactions (both with their colleagues and students), and maintaining and developing a sense of belonging to different academic communities (removing temporal-and-spatial barriers). The authors expect to provide more comprehensive (if not final) findings and insights during the presentation.

Keywords

Networked Learning; Emergency Remote Teaching; Personal Learning Networks; Phenomenography; Covid19.

Research Background

Higher education (HE) has long been experiencing a general trend towards digitalization, as technology has continued penetrating university campuses across the globe (Englund et al., 2017; John, 2015). The benefits luring universities towards digitization include greater individualization (Castañeda & Selwyn, 2018) as teachers enjoy increased autonomy over when and how they access information, as well as the possibility of interacting with large groups of individuals who may be geographically dispersed (Egiewela et al., 2022). This trend has often manifested itself in university teachers' pedagogical contexts as the promotion of technology-enhanced-learning (TEL) (Kirkwood & Price, 2014). For example, teachers are encouraged to enrich their face-to-face classroom experience by incorporating tools like interactive whiteboards (Kim et al., 2013) or game-based platforms such as 'Kahoot.' The digitalizing effort in HE has also produced the increasing variation of course delivery modes, such as blended learning (BL) (Ryberg et al., 2017) whereby teachers are asked to engage with students across a combination of both online and offline spaces on a single programme. Despite this long-term trend towards a more technologized

HE environment, not all university teachers have embraced this paradigm shift, and in fact, some have been resisted the trend (Englund et al., 2017; John, 2015; Krumsvik, 2014). Whether teachers' resistance to TEL integration is born out of low digital competence (Krumsvik, 2014) as they feel under-equipped to follow this trend, or whether it is a more attitudinal challenge for teachers who fundamentally or critically disagree with the imposing of technology on their pedagogical practice (Kim et al., 2013), the long-term digitalizing efforts in HE has not been successful as many teaching activities remain rather analogue (at least until the recent Covid-19 outbreak).

University administrators and leaderships have responded to teacher resistance by increasingly adapting their institutions' professional development (PD) programmes to include a greater focus on TEL (Dysart & Weckerle, 2015). Examples can range from the relatively practical training of teachers to operate new learning management systems such as Moodle (Kim et al., 2013) to the more fundamental tasks of discussing the pedagogical implications of smoothly integrating video-sharing platforms such as YouTube into their face-to-face lessons (Dysart & Weckerle, 2015). In parallel with such formal training activities, the practice of Networked Learning (NL), whereby teachers develop professionally through informal interactions with colleagues and online resources (Goodyear et al., 2004), has also taken place to one degree or another, especially ever since technology started penetrating teachers' everyday practice. Nevertheless, the impacts of teachers' NL on the changes in their pedagogical beliefs and practices related to TEL has remained relatively under-researched due to the informal (and often private and personal) nature of NL practices. In other words, NL-oriented PD activities and their impacts are less tangible than more traditional forms of institutionalized PD or training activities, whereby teachers' participation and engagement are officially observed, measured, and evaluated (and often certificated). Thus, it can be argued that despite the great potential for teacher changes, particularly in TEL settings, NL has been under-represented and under-focused as a PD mechanism across universities.

The aforementioned challenges have continued until the recent spread of the Covid-19 virus worldwide, creating a global pandemic, which interrupts all forms of face-to-face human activities, including teaching and learning (UNESCO, 2020; Adedoyin & Soykan, 2020). As the majority of HE institutions had largely operated in their long-accustomed face-to-face settings up to that point, the early part of 2020 delivered an unexpected blow to this sense of normality (Acuyo, 2021; Lee et al., 2021). This has led to many of these universities being forced to abruptly suspend their operations in the physical classroom and swiftly adapt to the online medium to meet the newly introduced social-distancing regulations. The many faculty-related challenges brought about by this disruption have ranged from their inadequate pedagogical preparation for operating online at such short notice (Carrillo & Flores, 2020) to the mental health strain caused by the physical isolation and stress that many of these teachers suddenly found themselves living under (Van Der Feltz-Cornelis et al., 2020; Leal Filho et al., 2021). Despite these hurdles, the wide consensus is that most universities have successfully continued operating in this relatively under-explored online environment throughout this emergency remote teaching (ERT) period. In other words, teachers may not have all been perfect 'swimmers', but few seem to have 'sunk' throughout this period.

While it may be true that, since then, some universities have reverted to face-to-face operations, questions remain about how the same faculty who had long demonstrated a certain resistance to technological integration suddenly managed to 'stay afloat' during the ERT event (authors, 2020). Many would argue that their learning networks, both in connection to other people and online resources, played a significant role during this disruptive event since institutional support was deemed minimal as universities were caught off guard (Rapanta et al., 2020; Hodges et al., 2020). That is to say, the notion that teachers were able to continue operating in this online environment that they were unexpectedly thrust into with little guidance from their institution may suggest that these university teachers relied on their NL connections in the absence of more traditional forms of university support and PD (authors, 2021; Green et al., 2020). That is, we argue that NL can be developed as a dominant PD platform to help teachers with the continuing transition to digitalization (during and after the Covid-19 pandemic). This calls for greater exploration into the use of personal learning networks during the ERT period in order to better understand how this NL-based PD platform can be exploited in the longer-term future. By informing university administrators (as well as teachers) of how to promote and support NL practices among their faculty, this investigation ultimately seeks to facilitate teachers' effective transitions into an increasingly technologized HE environment.

Research Problems and Question

The three interrelated research problems have directly emerged from the above teacher NL scenario during the ERT period. Firstly, the practical (and individual level) problems include the notion that university teachers may not fully realise the important roles that online forms of collegial collaboration and resource utilisation have played in their day-to-day pedagogical practice. This means that they are less likely to, for instance, proactively tap into

their network connections for support and thus may feel more isolated as a result (especially in ERT-like situations). Secondly, there is a gap in our theoretical understanding of university teachers' learning practice since a significant weight of existing PD literature focuses on NL from a student perspective (Mensa & Grow, 2020; Shim & Lee, 2020; Elmer et al., 2020), as opposed to a faculty one. This partly neglects university teachers who unexpectedly or unintentionally find themselves in this online environment, either gradually as technology seeps into HE campuses (or abruptly as a result of Covid-19-like scenarios). Finally, at the institutional level, HE institutions often prioritize overt and tangible PD practices such as certificated courses or documented observations at the expense of less visible practices such as collegial collaboration or the use of online resources. This status quo of placing little value and emphasis on NL activities (or personal and private interactions) is likely to lead to an increase in the slow and less smooth move towards digitization of HE. It may also be fair to say that teachers are less likely to put sustainable effort to use and develop those networks without the approval and support of their institution once their immediate needs are gone.
To address these problems, this study will answer the following research question: "How can university teachers' different perceptions and uses of networks for learning and teaching throughout the ERT period be explained?" More specifically, the present authors are interested in understanding 18 teachers' perceived benefits of using their personal networks for adopting (and coping with) the ERT during the Covid-19 pandemic. Using NL as a theoretical lens and phenomenography as a methodological approach, this study intends to uncover meaningful differences in teachers' perceptions and experiences with NL during the Covid-19 pandemic. Before introducing the study design, the following sections will briefly summarize two sets of literature closely related to the present phenomenographic investigation.

Emergency Remote Teaching

The tendency to use the term ERT synonymously, and often inaccurately, with similar labels such as remote teaching (Bozkurt & Sharma, 2020), BL or technology-enhanced-learning (TEL), means that a clear definition is needed early on in this paper. A contrast between ERT and these other forms of online teaching is challenging to present, given the overlap among them, however it is important as a clarifying starting point. Hodges et al. (2020) claim that ERT was born out of necessity at the beginning of the Covid19 pandemic, in order to differentiate between the hurried struggle to rapidly shift courses that were originally intended for face-to-face delivery to online format, from the carefully designed courses that are delivered by teachers experienced in online pedagogy. That is to say, ERT is reactionary and improvisational in nature (Bozkurt & Sharma, 2020), whereas other forms of online teaching are generally planned ahead for (Kentnor, 2015). Hence, for the purposes of this investigation ERT is defined as "the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has been abated" (Hodges et al., 2020, p.7). This definition encapsulates both the unforeseen nature of the phenomenon, as well as its acceptance as a temporary measure; albeit lasting longer than initially predicted by many institutions.

HE programs that are originally intended for online delivery of some kind, whether this is entirely remotely, using a combination of face-to-face and online delivery as BL suggests (Garrison & Vaughan, 2008), or by using technology in the classroom to improve elements of a face-to-face course as TEL implies (Kirkwood & Price, 2014), undergo rigorous preparation before the start date (Kentnor, 2015). Means et al. (2014) describe the range of moderating variables that are considered when designing an online course, including the synchrony of the program (asynchronous vs synchronous), the pacing (self-paced vs class-paced), instructor role (active vs passive) and so forth. The 'emergency' part of the ERT acronym on the other hand, highlights that, in many ways, it is the very opposite of a conscientiously designed course intentioned for delivery in an online space, since there is little time to consider these variables in advance (Rapanta et al., 2020; Mohmmed et al., 2020). A rapid and unforeseen shift from physical to virtual learning spaces, such as the one experienced across HE institutions during the initial Covid19 lockdown (Green et al., 2020), meant that teachers who are inexperienced in online teaching were left to deliver improvised versions of their courses (Carrillo & Flores, 2020), that were originally intended for face-to-face settings, using little more than their home computers and support networks. It could thus be argued that the recent ERT period has produced a stressful scenario whereby teachers "are building the plane while they fly it" (Trust & Whalen, 2020, p.193).

Aside from the unplanned nature of ERT, another key factor that differentiates it from other forms of online teaching is its association of temporariness. Planned online courses in various forms, whether they adopt a BL, completely online or any other format, have existed since the early 1990s (Kentnor, 2015). This means that these courses have benefitted from multiple rounds of feedback over the years (Meikleham & Hugo, 2020), whether that

is from student evaluation surveys or from instructor input on the overall success of the courses in meeting their aims. These courses are therefore continually adapted (Boud & Molloy, 2013), since the understanding among the stakeholders is that the programmes are there to stay in the long-term. ERT on the other hand, is seen as a temporary measure taken by institutions to help them cope with an unforeseen event that is causing disruption to face-to-face courses (Hodges et al., 2020; Toquero, 2020). The mutual understanding among students, faculty and other stakeholders is that ERT is to be used as a crutch that will enable programmes to continue, albeit under a 'new reality' that is assumably less than optimum. The common association of this 'new reality' of ERT as resulting in an inferior experience for students and teachers alike, is often excused by the calculated assurance that face-to-face teaching will resume in the near future. In other words, the collective assumption that ERT is a short interim before returning to 'normal,' means that the HE community is more likely to overlook gaffes on Zoom as faculty experiment with this tool for the first time, forgive lower attendance from students who struggle to access a computer and exercise patience with institutions who take longer than expected to organize the relevant training.

Networked Learning

NL exists in an educational context in which different technologies are embedded in HE (Gourlay et al., 2021; Cutajar & Montebello, 2018), in order to create a learning space that is non-binary. That is to say, technology has permeated HE to the extent where no course can be seen as either purely face-to-face or online, since technology is often integrated into face-to-face courses, in the same way that online courses often include face-to-face elements. Face-to-face course participants are just as likely to collaborate in the virtual world via social media outside the classroom, as online course participants are to arrange physical meetups. Given the rapid development of the NL field (Jones, 2015), it is important to adopt a clear definition early on in this paper, which will then be referred back to in subsequent sections. Hence for the purposes of this study, NL is defined as "Learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources" (Goodyear et al., 2004, p.1).

It should be clarified that the technology itself is not the focus, but rather the way in which it is used to bridge these connections (Gourlay et al., 2021; Goodyear et al., 2004) for the purposes of learning. In fact, the interactions between network connections may not always be purely online (Dohn et al., 2018), given that NL can, for instance, occur in a BL context which partly involves face-to-face contact with physical people and resources. While this web of connections is unarguably central to NL (Jones, 2015), it should be emphasized that the link between an individual and resources, rather than to other people, alone is not enough to constitute NL (Carvalho & Goodyear, 2014). After all, technological advancements, such as the ability to quickly share a useful resource link on an SNS like Twitter, have shifted focus away from content and pushed it towards connecting likeminded individuals who are likely to share resources and expertise (Brown & Adler, 2007). This implies that NL places emphasis on social learning and dialogue (Ryberg et al., 2012) that requires person-to-person interaction of some kind and that human connections are generally perceived as more valuable than resource ones (Goodyear et al., 2004). This contrasts with the independent online learning that is sometimes associated with open educational resources (Tuomi, 2013), whereby an individual may trawl information-rich resources online such as Wikipedia without discussing this material with others.

NL can manifest itself in different forms according to different scenarios, as well as on the purpose for which an individual taps into their personal network(s). For instance, Lave and Wenger's (1991) Communities of Practice (CoPs) concept revolves around the close collaboration of individuals on a common task (Hofer et al., 2021). This relates to NL in the sense that interactions between CoP members can take place across a blend of virtual and physical spaces (Gourlay et al., 2021). However, this narrow use of NL within a single intimate learning community contrasts somewhat with NL's broader concept of networked individualism (Jones, 2012), which portrays a different use of networks, whereby an individual dips in and out of a range of much wider webs than the single tight-knit set of connections (Lave & Wenger, 1991) that is characteristic of CoP member interaction.

This investigation is more focused on this latter flexible use of PLNs (Dirckinck-Holmfeld et al., 2011; Jones, 2015) to maintain bridges to multiple connections (Jones, 2012), whereby a teacher might, for example, be asked something by a close colleague from one network on Moodle and then use Twitter to reach out to a wider web for the answer. As previously mentioned, technology's penetration into HE (Cutajar & Montebello, 2018) means that the use of PLNs is likely to take place both online as well as offline, now that technology has become omnipresent in many university campuses. The focus of this research is thus on how this set of micro-interactions with a wide variety of people and resources over the ERT period has been perceived and approached by different EAP teachers.

Methodological Framework

Phenomenography is a research approach that seeks to unveil a plurality of ways in which a single phenomenon can be perceived (Cutajar & Montebello, 2018; Akerlind, 2008). The methodological focus is on the participants' self-articulation of how they themselves view the subject in focus at that particular time, usually through the channel of a semi-structured interview (Yates et al., 2012). While this perception is likely to differ from one participant to the next, some individuals tend to share certain perceptions with others. This results in a finite number of differentiable themes, known as categories of description (Örnek, 2008), representing the varieties of the participant group's perceptions. At the end of the phenomenographic investigation, the structural relationships between these categories are established in the form of visual representations known as outcome spaces (Hajar, 2020). As a result of the present investigation, four outcome spaces were established regarding how the participants perceived the phenomena of NL in the context of ERT during the Covid-19 pandemic, with a particular focus on the benefits of network use.

The main reason for adopting a phenomenographic research method for this investigation is that it is *not* our aim to unveil a single narrative about the NL phenomenon shared among the teacher participants *but* a variety of different ways in which the participants perceive the same phenomenon (Rands & Gansemer-Topf, 2016; Marton, 1986). It is grounded in our belief that the NL phenomenon has been experienced by individual participants rather differently during the Covid-19 pandemic when they were physically separated (and isolated), thus consequently, there should be a great diversity of their perceived value of the phenomenon. Phenomenography is a non-dualist method (Hajar, 2020), which is well-aligned with the constructivist and interpretivist research paradigm employed in this study. We accept a plurality of different 'truths' according to each individuals' beliefs, rather than a dichotomy between 'good' and 'bad' versions. Even for those who reject these ontological and epistemological assumptions by believing that there is only one objective truth, it is difficult to deny the value of having insight into an array of different interpretations. By reviewing alternative perspectives to one's own belief, one may eventually change their own view (Örnek, 2008). Therefore, we argue that it is valuable to all researchers, regardless of their research paradigm, to gain a more informed collective understanding of the different ways in which their focused phenomenon can be experienced, rather than be blinded to all but a single one of these interpretations.

Data Collection

The qualitative data was collected from a leading English-instruction university in Kazakhstan. 18 English-as-Academic-Purpose (EAP) instructors from the university's foundation program were chosen using a purposive sampling strategy (Khan et al., 2019). It is a common approach to participant selection in qualitative investigations, where each interviewee can yield rich information (Palinkas et al., 2015; Yates et al., 2012). Participants were recruited via an email sent by the first author. The email provided a detailed description of the study in the attached 'participant information sheet', which emphasized the optional nature of participation. 18 participants in total, which fits within the recommended 15 to 20 range for phenomenography (Trigwell, 2000), agreed to participate in a semi-structured interview. All agreed participants signed a participant consent form. Lancaster University's research ethics committee granted the ethical clearance for the project. The interview duration was intentionally left open (between 30 and 60 minutes in the participation information sheet) in order to cater for both loquacious participants who may easily have discussed their perceptions of networks for a full hour and laconic interviewees who may have struggled to reach half an hour (and for everyone in between these two ends of the spectrum). In the end, most interviews lasted around the 45-to-50-minute marker. After conducting 18 interviews, we became confident in reaching the data saturation as the repetition of themes emerged and noticed and thus, began the data analysis process.

Data analysis

Phenomenographic analysis requires the researcher to engage multiple times with transcriptions and produce "qualitatively different conceptions of the phenomenon of interest collectively rather than the conceptions of individual participants" (Sin, 2010, p1). This iterative process (Akerlind, 2005) means that phenomenographers have to stand back and analyze each participant's perceptions both individually within the confinements of each separate interview, as well as in relation to the perceptions of the other participants' interviews (Hatch, 2002). This latter collective interpretation of data is particularly important (Cutajar & Montebello, 2018) as similarities and differences in the perception of the phenomenon cannot be identified by merely analyzing each participant's transcript individually in disconnection from the others. We have followed the steps below, but these steps do not

represent a rigid and linear process but rather a "circular and iterative" process (Casey, 2016, p.77). It has also been our attempt to be led by the data without relying on pre-existing assumptions.

Step 1 – Transcript RQ Summarizing Excerpts
Despite the researcher (the first author of the present paper) being somewhat familiar with the participants' individual accounts from the preceding transcription process, it was decided that short, summarizing excerpts for each transcript would provide a useful starting point. This involved reading each transcript, whereby the researcher skimmed through it with the RQ in focus. All excerpts deemed relevant and summative of the participant's perception of the area of the phenomenon targeted by the particular RQ were highlighted according to a colour code. Once all summarizing (and related) excerpts had been highlighted in one transcript, the process was repeated with the subsequent transcript.

Step 2 – Tabled RQ Excerpt Comparison
Still within the context of their respective transcripts, summative RQ excerpts were selected from the colour-coded data and tabled. Despite the excerpts still being divided according to individual participants' transcripts at this stage, the tabling of this data facilitated the comparison and contrasting necessary to progress onto the subsequent step of identifying categories of description from a combined data pool. That is, the side-by-side presentation of excerpts that resulted from this second step enabled the researcher to remove the boundaries between separate transcripts in the subsequent third step.

Step 3 – Generating Initial Categories of Description
Through the combination of reviewing the excerpts in the tables above and re-visiting the individual transcripts, the researcher began to produce preliminary categories of description to represent qualitatively different ways in which the sample group of participants could experience the target phenomena. This required a step away from individual transcript context and towards identifying perceptions identified at a collective level from the participants as a whole (Hajar, 2020). This step resulted in 4 draft description categories applicable to multiple participants. Again, these categories were placed into a table with matching representative excerpts extracted from different transcripts.

Step 4 – Refining Categories of Description
Before producing an outcome space, the description categories that resulted from Step 3 were reviewed one by one and re-enforced with evidence from the transcripts. This connection between the two steps is highlighted by Rands and Gansemer-Topf (2016) in their statement that "initial descriptive, or "draft," categories help guide the next phase of the analysis" (p.11). Thus, the researcher cross-checked the preliminary description categories against the information from each transcript, both coded and uncoded (Bowden & Green, 2005), in case the researcher had missed items in the initial coding.

Step 5 – Determining Outcome Spaces & Step 6 - Determining Structural Relationships
The outcome space is essentially a visual presentation of the description categories (Hajar, 2020). the outcome space brings together all of the different descriptions to determine the structural relationships between these variations in how the single phenomenon in question can be perceived (Akerlind, 2005). Instead of stating these in list form, the outcome space uses visual cues (such as arrows or boxes) to present how these categories are interconnected. Once outcome spaces were established, the researchers began to look for possible connections and relationships between them. Two authors of the paper collaboratively conducted these two steps.

Step 7 - Review
This final step involved the researcher revisiting the transcripts and the tables generated in the previous steps to ensure that the categories and structural relationships were constructed as accurately as possible. To achieve this, the researcher took a break from the data analysis process to clear his mind and then re-attempted steps 2 and 3. This allowed the researcher to compare his earlier outcome space with the revised one and make changes until stability was achieved in terms of categories and their relationships to one another (Trigwell, 2006). By this stage, the researcher had engaged in multiple reiterations of the data, involving the non-linear analysis cycle of re-reading, re-testing and re-comparing described above (Rands & Gansemer-Topf, 2016). Therefore, he could be reasonably confident that no key categories or structures had been overlooked.

Findings

The categories of description presented below represent the refined themes that emerged at the end of the data analysis process for the study's RQ: What are the qualitatively different ways in which HE teachers perceive that their use of networks has been beneficial for the purposes of learning and teaching during the recent ERT period?

The four inter-related themes below represent the respondents' perceived variation of how NL can be advantageous to them as teachers in one form or another. The hierarchical relationship between these categories is presented in ascending order of complexity and sophistication. That is to say, the first category represents the most basic benefit associated with network use, whereas the fourth category depicts the most advanced NL reward. In order to scale to the highest category, teachers must first perceive and access the first three themes. Before detailing each theme and presenting the corresponding evidence in the form of supporting transcript excerpts, a general overview is provided in the pyramid figure below.

Figure 1 Description Categories Pyramid

Category 1: Flexible Access to Online Resources

The main features associated with this first description category revolve around the use of networks as a bridge to existing material that can be retrieved conveniently from one's home workstation. This appears to be the most basic benefit that teachers associate with their use of networks. These sources include official PD webinar recordings, that are part of ongoing developmental courses for teachers tackling the latest issues that have emerged or raising debate over current trends in practice. Despite their being other teachers on these online courses with whom to participate with, faculty appear to exploit asynchronous engagement with the resource banks attached to the programmes instead, since this can be done more flexibly and without having to rely on another person. Some teachers even archive some of the course material themselves by recording or screenshotting important elements, to then be able to access flexibly at a later date.

> "webinars and conferences that are almost weekly there Thursday one or two TELSIG, I would go to those almost every week… …Because yeah so everything was online and on zoom basically at this point so um I attended conferences webinars a lot more than I normally do… …Almost every week, I was doing something oh yeah then also I also did two courses online courses for you know they were… …professional development type courses specifically related with EAP" (Participant 1).

> "I actually record the lessons… …On my just on our little recorder, and I also um print the screen… …So I made it So to that extent I'm doing something I'm engaging more I'm able to go over the lesson again and listen to what the tutor said and what we said and look at the print on the on the screen" (Participant 3).

> "My hours are a little bit more flexible now. I feel like I have a yeah it's mostly with time, I have a greater choice in when I want to do things" (Participant 6).

> "professional development, I suppose it's made it easier in a way, because you can attend various conferences or seminars, or whatever from wherever you are, irrespective of where it's being held" (Participant 7).

Online resources can also be accessed via comparatively informal channels, such as media-sharing websites like YouTube, for teachers to readily access at a time that suits them without the need to formally join an online course. These platforms contain instructional videos that offer guidance to faculty on using the latest online platforms for instance. Similarly, teachers can access online material via other channels outside of a formal PD course, such as an editable wiki page or a forum that posts step-by-step guides on trouble-shooting commonly used tools like Moodle.

> "I'm… …being very thankful for Russell's Stannard's… …website where he goes through lots and lots of tutorials on things that I wasn't familiar with" (Participant 11).

> "I've learned a lot about Moodle through… …almost like a wiki they have this… …Information page and that's kind of where I learned things and then also there's Moodle forums… …And that's where that's where I usually find the answers to questions that I don't know" (Participant 6).

Lastly, it can be noted that some teachers access online resources via social media repositories. These can come in the form of videos or instructions that are regularly uploaded to a popular platform such as Instagram or Facebook for instance. Teachers can 'follow' influential figures in their field and thus access their material asynchronously if and when they feel the need.

> "when it came to this like psychology and hobby because I follow, like many… …professionals in this field by Instagram they have… … it's very useful in terms of psychology and coaching… …That they have their own lectures online and then they save it, you can watch it, so I think that was very helpful for me" (Participant 18).

Category 2: Flexible Access to Others

This second description category is centred on teachers' use of their personal networks to interact with other like-minded professionals, as opposed to only engaging with online resources as in the first category. Rather than limiting engagement to the basic asynchronous access of material, teachers describe their networks as tools with which they can keep their fingers on the pulse of current trends and practice by staying informed on how other faculty are tackling emerging issues. This includes interacting with current colleagues and acquaintances, but also extends to connections from previous workplaces and institutions with whom some faculty seem to maintain contact with even after they move onto a new job.

> "[online conferences] it's just great to hear what other people are doing out there… …kind of cool just to see kind of compare yourself okay what how do I match up with what everyone else is doing… …it's nice to hear that actually they face the same challenges that we do" (Participant 1).

> "By the way, I'm engaged each week I meet, I have a Russian course which up with another with our colleague from engineering… …meet our Russian teacher online twice a week for an hour and that has been going on since the pandemic I also meet a cousin of mine and we studied Greek together and online… …This is with zoom with it, no, this is with Skype… …and so I, so I am engaged in online learning" (Participant 3).

> "very well developed network, like in this area yeah in this field, yet, so what I have is my professors and my teachers and the students, with whom I studied in Colorado so… …We asked questions I asked about you know about different things it's like you know my it's my basically foundation" (Participant 5).

Teachers describe how this interaction with others is often undertaken in a flexible manner that can be moulded around their individual commitments. Aside from being able to use online communication to eliminate physical geographical barriers that facilitate engagement with others in faraway destinations, NL also offers flexibility in terms of the number of participants that can join and then leave group activities at their own convenience depending on the evolution of their needs and preferences. It appears that the dipping in and out of online networks is more flexible that in traditional face-to-face engagement with others, given the reduction in planning and physical travel involved when switching between social groups online.

> "I like the flexibility a lot… …More flexible, I mean, for example, there are like some webinars that I had to attend and they were from because of time zone you different time zones, for example, some of them were I didn't know like… …I could attend this webinar… …And then I can switch to like 15 minute break and my lessons for us right which I wouldn't be able to do if I was in class, of course, or I had to go to my office or commute time you know preparation, all this paperwork printing bringing opening classroom and so on… …I just found working from home, but as I said, more productive" (Participant 13).

> "There was a wider group, and then it a few people fell off and now it's just myself and this other colleague" (Participant 3).

Lastly, it appears that some teachers value the flexibility of participation that they associate with online network interactions. Rather than face the pressure of being very actively involved in every discussion, some faculty appreciate the option of more passive interaction that online engagement facilitates. This can enable engagement not only between faculty, but also with their students.

> "there's a bit of a distance, with this online, I think, which allows you a bit more breathing space to think about what you're going to say to prepare a bit without a person actually physically right in front of you observing you… …Even for me that can make things easier and I think for some students, especially the shy ones that can make them feel about a lot more relaxed" (Participant 15).

Category 3: Personalized One-to-One Interactions

Once teachers have been able to benefit from the increasingly flexible interaction with online resources and with other professionals as described in the previous two categories, they can progress onto the advantages of experiencing more personalized encounters with others. This category of description targets the intimacy that teachers often associate with their use of networks to engage with individuals and even small groups. Some of the participants mentioned colleagues by name, with whom they had experienced helpful and supportive personal interactions with throughout what they perceived to be a challenging ERT period. These one-to-one encounters take place across a combination of different mediums that include online contact, telephone conversations and face-to-face meetings.

> "support from colleagues, I would say that was the key thing to get me through the year… …I contact most Michael, as I said, is a neighbour and a friend… …And he's on the technology team… …And I see you know [teacher 1] and [teacher 2] went out for pizza the other night" (Participant 2).

> "And [teacher 3] too my supervisor [teacher 3] is very supportive and always you know… …a phone call away" (Participant 2).

> "in a team meeting I would open the camera because I would like to see my co workers that I would like them to see me it just feels like Okay, maybe we have to see each other…" (Participant 12).

The interviewed faculty members extended this favourable perception of one-to-one and small group interactions to include engagement with their students, as well as with their colleagues. It appears that individual tutorials for instance, whereby teachers meet their students to discuss bespoke feedback that applies uniquely to the individual pupil, have been notably more personal and intimate during the work from home period. Some teachers attributed this sensation of closeness to the notion that they are connecting to their students from one living room to another with minimal interruption. That is to say, there are minimal physical distractions, such as waiting rooms or noise from the classroom next door, in between the teacher and the student

> "I was amazed at how in tutorials one was able to relate to the students and to stay, true to a create, if you like, a pedagogic encounter are a personal encounter I was, I was taken aback by that" (Participant 3).

> "tutorial it was more personal… …In the group, where you know you're talking to the group so they got into the habit of not putting their video on… …But when it was one to one it probably felt more personal and they wanted to you know to see you" (Participant 4).

> "It was a bit, especially given feedback was a bit more direct and easier to do because it was right there the student or yourself could share the screen and you could see it at the same time" (Participant 6).

> "I think, being at home, being in whatever they chose to wear which was… …Probably rather than formal attire… …less formal than they would be in class, and you know just they're being able to have their snacks or whatever um… …I think there was a lot more, it was a lot more personable and it was really valuable to see what was going on with the students' lives to be able to observe that in the room" (Participant 14).

Some teachers associated these more personalized encounters as being the result of having longer periods of time to dedicate to the meetings. The eliminated travel time between home and work for instance due to the work from home mandate, meant that tutorials could be extended.

> "I think that the half hour tutorials are very good… …felt was sort of more intimate in a way… …they're facing you they've got to face you they've got to have their cameras on they gotta talk and you know you can ask direct questions, and they have to answer" (Participant 9).

Category 4: Belonging to Academic Communities

The final and most sophisticated benefit associated with network use, once teachers have reaped the rewards of flexible access to resources, others and established more intimate encounters, is a sense of membership to professional communities. Faculty experience increased confidence as their networks enable them to compare their views and practice with those of others. This can help to validate their pre-existing approaches to teaching, as well as to expose them to novel ideas that they may have not have had the imagination or assertiveness to test out without the feeling of protection and belonging to these professional communities.

> "[online conferences] it's just great to hear what other people are doing out there… …kind of cool just to see kind of compare yourself okay what how do I match up with what everyone else is doing… …it's nice to hear that actually they face the same challenges that we do" (Participant 1).

> "To get you know different sources or different you know opinions, because you know, like it helps it helps me in anchoring my own decision" (Participant 5).

> "I had the opportunity to complete that course and explore different ideas and develop my own awareness, you know, both in terms of training, the learners on doing helping them… …I found it quite useful professional development experience to apply some of the skills that I learned on that course… …just checking your existing knowledge with others… …Whether your interpretations are correct yeah engaging with the Community to certain assumptions that you've built up over time, the extent to which… …There is a consensus about them all, whether you need to adjust your own thinking is always useful" (Participant 17).

Some faculty went further by extending their use of membership to these professional communities to cover personal, non-work-related matters also. This signals the increasing confidence and support that this sense of belonging to a wider-group can offer teachers, as they feel safe enough to share views on aspects of a more personal nature.

> "It was just mutually beneficial that we… …help each other… …teaching and learning so and then, in addition, just some things like personal things came… …that are not directly related to work" (Participant 5).

Conclusion

This investigation aims to contribute to the following three interconnected areas with the problems detailed above in the earlier section of this paper in mind. On a practical level, the aim is to raise awareness of the role that technologically facilitated networks play in the day-to-day activities of university teachers in a bid to encourage greater future collegial collaboration and exploitation of online resources. This is likely to mitigate practical challenges encountered by teachers in future unexpected calamities such as the Covid-19 pandemic ERT, but more importantly to help them adjust to the gradual slide towards the (non-emergency) online environment that HE has been experiencing in the long-term. At a theoretical level, this research seeks to plug the hole in teacher PD literature regarding the uses and perceptions of technology-mediated networks by faculty, rather than students, accustomed to working in a predominantly face-to-face teaching environment. That is, this study puts the spotlight on teachers who would normally perform their PD practices in a physical environment but have suddenly been pushed into the online space by an abrupt event such as Covid19 and have long been experiencing a paradigm shift towards digitalization outside of the ERT period. Lastly, at an institutional level, this study offers universities a clearer path towards establishing future policies that will enable their faculty to better support each other in a HE environment where technology plays an increasingly vital role; be it in an 'emergency' or a regular context. Thus, universities may seek to steer their teacher training and PD, legitimizing and promoting informal and personal practices, so-called NL activities.

The four description categories presented in the findings suggest that HE teachers place great value on interaction with both online resources and other people within their networks. While the first category centres on the benefits of accessing online material, it should be noted that NL places emphasis on social learning and dialogue (Ryberg et al., 2012), which means that the connection between an individual and online resources alone is too basic to be considered valuable NL (Carvalho & Goodyear, 2014). The more sophisticated categories in which interaction with others, both close colleagues as well as more distant professionals, is perceived as the main benefit of NL by the interviewed teachers. This aligns with the NL perception that human connections are generally more valuable than resource ones (Goodyear et al., 2004). It should be noted however, that the most sophisticated category of community membership is specifically enabled by the online medium, which facilitates a teacher's flexible interaction with a higher number of professionals across far away distances. This means that, looking to the future of the digitalization of HE, it is this sense of membership to multiple professional communities that institutions should be promoting among their faculty.

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Sustainable Learning Design: a case study of eight undergraduate science module interventions

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Abstract

This article presents the results of a case study of eight undergraduate science modules on factors for sustainable Learning Design interventions. Using a mixed-methods approach involving educator interviews, statistical data, screening of learning designs based on a furthered learning design model (STREAM), student surveys, and an efficiency assessment based on the concept of Efficient Learning Design, a total of six factors for sustainable Learning Design in the context of science higher education related to the educator perspective and the actualised learning designs are identified. The article concludes that in addition to the direct factors such as the number of enrolled students and repetition of modules, the educators' consideration for the institutional cost-benefit perspective, their perceived usefulness of technology-enhanced learning and buy-in of its related pedagogy, the students buy-in of technology-enhanced learning, and a consistent structure with online activities, reflection exercises, and feedback are significant underlying factors for efficient and sustainable Learning Design.

Keywords

Learning design, sustainability, Efficient Learning Design, technology-enhanced learning, designs for Networked Learning

Introduction

The ambitions for educational technology and technology-enhanced learning (TEL) in higher education are continuously growing in the light of the need for widening access, maintaining quality, supporting online and distance education in the context of the Covid-19 lockdown, and avoiding dramatically increasing costs (Daniel et al., 2009). As a consequence, Learning Design is currently gaining footing as an educational development methodology to systematically introduce educational technology in higher education in a potentially effective and efficient manner. Learning Design has demonstrated a potential for supporting educators in introducing educational technology in higher education in a pedagogical qualified and potentially effective way supported by pedagogical models or through an orchestrated process (Bennett et al., 2014; Conole, 2013; Dalziel, 2016). However, as most research on TEL is focused on the effectiveness of the technology and applies different methods to measure this across cases, there is a pressing need to investigate the balance between efforts and effects, i.e., the "efficiency" (Godsk, 2022), as well as to look for design and delivery factors that are important for making learning designs efficient and the delivery sustainable across modules. Based on a large-scale Learning Design initiative at a science faculty, this study includes science educators who have participated in Learning Design workshops, designed, and implemented blended and networked learning designs in their modules. To guide the research the following research question was phrased: What are the learning design and delivery factors for sustainable Learning Design interventions in science higher education?

Background

The context of this study is a large-scale science faculty covering all traditional subject areas ranging from Science and Mathematics to Engineering and Computer Science. The faculty is research-intensive with an annual turnover

of 341m euro of which 44% originates from external research grants. 7,053 students are enrolled across the programmes and there are 1,731 members of the academic staff (2019). In 2017 the faculty introduced an ambitious strategy for TEL to improve students' preparation out-of-class, feedback, independence, collaborative, and reflective competencies; as well as give educators insight into the students' learning outcome and level of understanding and competence. In addition to the TEL strategy, the educators had additional, module-specific goals with introducing technology.

The Learning Design process was organised as a two-step process. The first step was a three-hour workshop that introduced the ambitions of the Learning Design methodology, the flexible STREAM Learning Design model (Figure 1; Godsk, 2013), the potential of TEL illustrated by 4–5 local cases, and included a hands-on session, where the educators shared experiences with TEL as well as clarified goals and key pedagogical features of their redesign and their intended use of technology. STREAM was used as a flexible but consistent framework to present pedagogical ideas during the process, which made it a useful starting point for analysing the actualised learning designs and associating this with the effects of the module delivery.

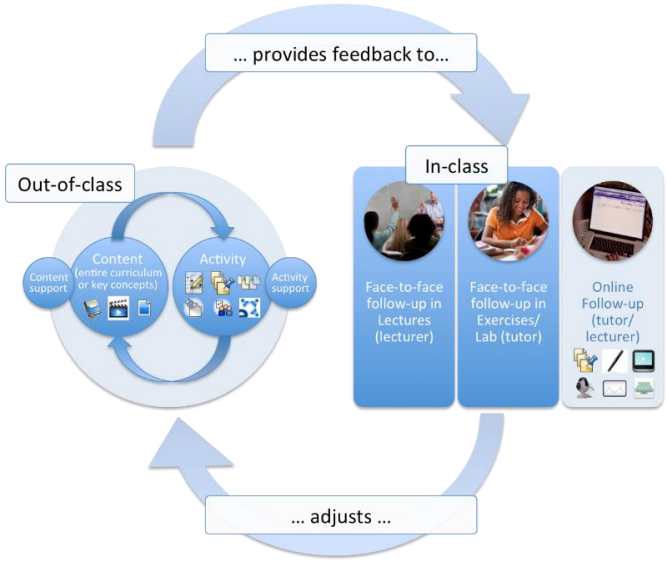

Figure 1. The STREAM Model.

The workshop was followed by an optional second step in which individual in-depth representations of the learning designs were developed and technical implementation and media production support was provided. After the workshop, ad hoc pedagogical, technical, and media support were provided as needed as well as an optional follow-up workshop one year later. Approximately, half of the educators participated in the second step of the workshop and made use of the subsequent ad hoc support.

Methodology

The research is based on a mixed-methods case study of eight module interventions. The modules were sampled by inviting all science modules that have completed the structured Learning Design process starting December 2018 with module delivery during autumn 2019 (N = 18). Eight diverse modules of 5–10 European Credit Transfer System credits (ECTS) accepted the invitation and are included in this study (n = 8): two in mathematics, two in biology, one in molecular biology, one in computer science, and two in geoscience. In total 1,311 students passed the modules, ranging from 15–395 students per module. An overview of the eight cases is available in Table 1.

Data sets were collected for the eight Learning Design interventions examining the efforts and impacts associated with the intervention, the characteristics of the actualised learning designs, the educators' perception of TEL and the intervention, and the delivery of the design, including its impact on the students. In practice, this was carried out by screening the learning designs according to the STREAM model by observing the module pages in the virtual learning environment (VLE), Blackboard Learn. The ideas of the STREAM model were concretised into nine design feature items: (1) a cyclical process shifting between out-of-class, online preparatory content and/or activities followed-up by in-class and/or online activities; (2) out-of-class, online activities designed so they

provide data to the educator and/or tutors about the students' learning; (3) that the educator and/or tutors provide online and/or in-class feedback on the out-of-class, online activities based on the generated data; (4) data is used to adjust in-class and/or online (synchronous) activities related to the curriculum of the present loop/week; (5) experiences with the in-class and/or online (synchronous) activities is used to adjust the out-of-class, online content and/or activities of the following loop/week; (6) out-of-class activities are designed as an online, cyclical process with several steps shifting between content and activities that activate the content; (7) out-of-class, online activities where students are asked to reflect on their own learning/understanding of the curriculum; (8) online support provided in forums or similar on both content and activities; and (9) out-of-class activities are designed to be thought-provoking and/or require the student to explore, synthesize, and/or formulate answers for actualising higher levels on the SOLO or Bloom's taxonomies. Thus, from a networked learning perspective item 2 and 3 indicate the connection between the student and the educator, and item 8 indicates the connection between learners (and the educator) (Dirckinck-Holmfeld et al, 2011; Ryberg et al., 2016). Based on the observation, the available data, or the educator interview, the designs were scored on a five-point Likert scale ranging from (1) 'not at all', indicating that the design feature was not implemented, to (2) 'a small extent', to (3) 'a moderate extent' indicating that the design features were implemented in approximate haft of the activities/weeks, to (4) 'a great extent', and to (5) 'a very great extent', indicating that the feature was implemented throughout the module. For item 9, the scale refers to the extent of out-of-class activities that require the student to, e.g., analyse, relate, evaluate, and create, and thus qualify as being on level four ("Relational" or "Analyze") or above on the Bloom's or SOLO taxonomies. For item 8, designs that did not include online support were scored as (1) and designs in which both content and activity support was available in an online forum and capitalised were scored as (5). To ensure inter-rater reliability each score was discussed by the three researchers and the scales were adjusted until they were unequivocal and the scores were identical. The scores for each redesign are provided in Table 1.

In addition to the observations, semi-structured educator interviews were carried out following an interview guide with questions on their perspective on technology-enhanced learning and technology acceptance (inspired by the Technology Acceptance Model, TAM, by Scherer et al., 2019), the learning design and delivery, and the relative scale of the associated efforts and impacts associated with the intervention. That is, did the educators perceive the efforts and impacts associated with the design and delivery of the module as lower or higher than previously and to what extent. To further validate the efforts and impacts of the learning design and delivery, statistical data on students' online module activity in the VLE, pass rates, grades, and module evaluations were used to data triangulate the answers in educator interviews as well as provide insights into students' learning and preferences.

To interpret the balance of efforts and impacts of the interventions and to identify the underlying factors for sustainable learning design, the concept of Efficient Learning Design (ELD) (Author, 2022) was utilised by mapping the eight cases (Figure 2). In brief, ELD analyses the efficiency of Learning Design interventions by mapping the required, aggregated efforts to design and deliver the desired, aggregated impacts compared to before the intervention and by calculating the positive or negative distance to "break-even". This yields four potential outcome scenarios referred to as progressive, underperforming, regressive, and outperforming (Figure 2) as well as a quantifiable magnitude of the Learning Design efficiency (Table 1). For instance, an increased impact at a lower effort yields an outperforming intervention, whereas a decreased impact at a lower effort yields a regressive intervention (ibid.). In progressive and regressive scenarios, the balance between efforts and impacts become important. An outcome where the effort is just barely counterbalanced by the impact is considered "break-even", whereas outcomes where the impact outmatches the effort are considered "efficient". In practice, this means, that outperforming interventions are always sustainable in the sense they have been worth the efforts even though they are discontinued. Other interventions have the potential to be efficient and sustainable should they be located or over time move below the break-even line.

Identification of the underlying factors that affect the efficiency of the learning designs across the eight cases was achieved using a multivariate analysis supplemented with a qualitative analysis of the educator interviews. By correlating the efficiency outcome scenarios in Figure 2 with the STREAM design characteristics, educator perspective on TEL (according to the TAM scales: perceived ease of use (PEOU), perceived usefulness (PU), attitudes toward technology (ATT), behavioural intention to use technology (BI), and actual use (AU)), their efforts, impacts, data on students' online activity and their perceived (learning) outcome obtained from the module evaluations, it was possible to identify significant, potential design and delivery factors for efficient and sustainable Learning Design interventions (Table 2). However, as the sample size is small (n = 8), these correlations were merely used as signs of potential patterns and thus further qualitatively investigated and triangulated with the educator interview and other available data.

The eight cases

Despite being engaged in the same Learning Design process and presented to the STREAM model, the actualised design and delivery of the eight blended modules, as well as the educators' perspectives on TEL, were very different. The observation and screening according to the STREAM model revealed a large difference in the online structure, the activities, and the feedback processes (see Table 1).

Module alias (code)	Mathematics A (MA)	Mathematics B (MB)	Programming (PR)	Mol. Biology (MOL)	Microbiology (MIB)	Cell Biology (CB)	Mineralogy (MI)	Sedimentology (SE)
Subject area	Mathematics	Mathematics	Comp.Science	Mol.Biology	Bioscience	Bioscience	Geoscience	Geoscience
Educator	Full professor	Full professor	Full professor	Assoc. prof.	Assoc. prof.	Full professor	Assoc. prof.	Assoc. prof.
ECTS credits	10	10	10	10	5	10	10	5
Students (n)	323	395	210	137	96	123	12	15
Scale (total ECTS)	3230	3950	2100	1370	480	1230	120	75
Educator perspective on educational technology (TAM items) (likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly Agree)								
TAM PU	4	4	5	5	2	4	4	3
TAM ATT	5	5	5	5	3	5	4	4
TAM PEOU	2	2	3	2	5	4	4	3
TAM BI	1	1	5	5	1	4	5	2
TAM AU	5	5	5	5	4	4	5	4
Learning Design perceived efforts, perceived impacts, and calculated efficiencies (likert scale: -3 = high negative, -2 = medium negative, -1 = low negative, 0 = neutral, +1 = low positive, +2 = medium positive, +3 = high positive)								
LD effort*	-2	-2	+3	+2	-2	-1	0	+1
LD impact*	+1	+1	+2	+2	+1	+1	+2	+1
LD efficiency**	Outperforming ($3/\sqrt{2}$)	Outperforming ($3/\sqrt{2}$)	Progressive ($-1/\sqrt{2}$)	Progressive (0)	Outperforming ($3/\sqrt{2}$)	Outperforming ($\sqrt{2}$)	Outperforming ($\sqrt{2}$)	Progressive (0)
Student efforts and impacts								
VLE avg. activity	54.78 h	57.31 h	78.03 h	52.12 h	22.41 h	65.02 h	17.91 h	12.57 h
Perceived outcome	3.37	3.74	3.90	3.56	3.82	3.83	4.70	4.83
Pass rate	84%	89%	81%	88%	83%	97%	92%	100%
Learning Design characteristics (STREAM compliance), likert scale: 1 = 'not at all', 5 = 'to a very great extent'***								
STREAM item 1	1	1	1	5	1	5	5	1
STREAM item 2	4	4	3	4	2	5	5	2
STREAM item 3	4	4	2	3	2	4	4	2
STREAM item 4	1	1	1	1	1	2	2	1
STREAM item 5	1	1	1	1	1	1	4	1
STREAM item 6	5	5	4	4	1	4	5	1
STREAM item 7	2	2	4	5	2	4	4	1
STREAM item 8	5	5	5	1	1	1	1	1
STREAM item 9	1	1	1	4	2	4	3	1
STREAM total	24	24	22	28	13	30	33	10

*Compared to before the Learning Design intervention. **The Learning Design efficiency is provided as both the scenario and magnitude (the magnitude is calculated as the directional perpendicular distance from break-even (see Author, 2022), ***Details on how the STREAM items are scored are provided in the methodology.

Table 1: Overview of the cases

In three of the modules (MOL, CB, MIB), the online activities were designed with a consistent cyclic structure shifting between out-of-class online activities and in-class follow-up (STREAM item 1), whereas no cyclic structure was observed in the other five modules. Considering solely the out-of-class activities, six modules (excluding MIB and SE) were to a great or very great extent designed with an online cyclic alteration between content and activity (STREAM item 6). The out-of-class loop in four modules (PR, MOL, CB, MI) included activities that to a great or very great extent asked the students to reflect on their learning (STREAM item 7). Online content and/or activity support in an online, asynchronous Q&A forum or similar was provided in three modules (MA, MB, PR) to support networked connections between the students (STREAM item 8). In three of the modules (MOL, CB, MI), a large extent of the online out-of-class activities were on a higher learning taxonomic level (STREAM item 9). Except for SE, all modules were designed in a manner so that some or most of the activities provided data on student performance (highest for CB and MI, lowest for MIB) (STREAM item 2). These data were used for supporting networked learning by providing feedback to students (highest extent for MA, MB, CB, MI) (STREAM item 3); however, only two modules (MI, CB) used the data to adjust the in-class activities related to the curriculum of the present week (STREAM item 4). Furthermore, only one module (MI)

adjusted the online content or activities of the following week based on experiences from the in-class teaching (STREAM item 5).

Factors for sustainable learning design

The mapping of the educators' perceived efforts and impacts associated with the Learning Design intervention compared to previously revealed that five of the modules qualified as "outperforming", whereas the other three modules were "progressive" (Figure 2). Only one of the eight modules suggested that the efforts were higher than the impacts, which suggests that the intervention may not have been "worth it".

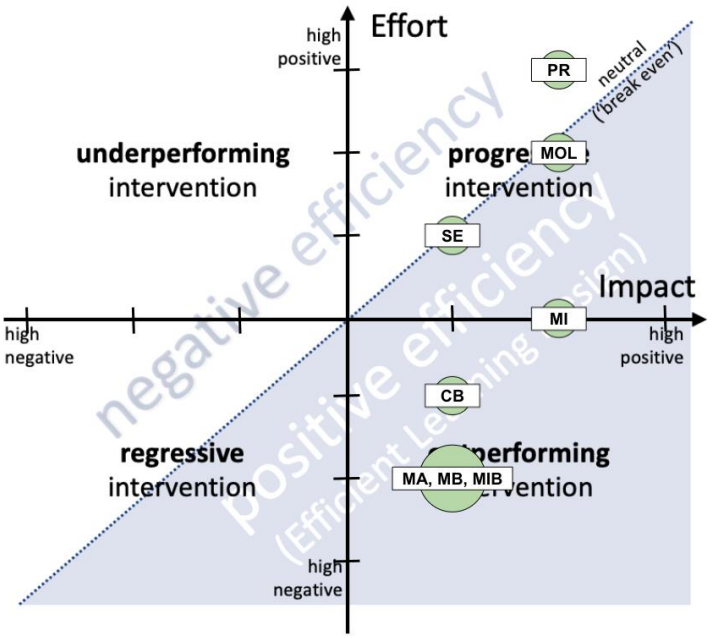

Figure 2: The efficiency of the eight module interventions.

Furthermore, the multivariate analysis identified a total of 15 significant correlations (marked with asterisks, Table 2), which were grouped into the following six factors: three related to the educator perspective, one related to the student perspective, one related to the design and networked learning characteristics, and one related to the scale of the module.

	TAM PU	TAM ATT	TAM PEOU	TAM BI	TAM AU	VLE activity	Students' perceived outcome	LD impact	LD effort	LD efficiency
TAM PU	1	.858**	-.624	.673	.731*	.703	-.287	.866**	.579	.012
TAM ATT	.858**	1	-.755*	.294	.548	.820*	-.468	.535	.241	.304
TAM PEOU	-.624	-.755*	1	.066	-.643	-.428	.374	-.404	-.186	-.255
TAM BI	.673	.294	.066	1	.286	.244	.208	.839**	.757*	-.382
TAM AU	.731*	.548	-.643	.286	1	.401	-.305	.683	.229	.244
STREAM item 1	.383	.183	.153	.716*	.067	.000	.096	.488	.194	.111
STREAM item 2	.561	.557	-.174	.437	.436	.349	-.177	.468	-.146	.649
STREAM item 3	.309	.477	-.272	.000	.383	.221	-.244	.153	-.506	.917**
STREAM item 4	.078	.000	.480	.480	-.149	-.091	.351	.218	-.118	.348
STREAM item 5	.051	-.267	.314	.419	.293	-.453	.565	.429	.026	.228
STREAM item 6	.738*	.729*	-.499	.308	.799*	.562	-.364	.570	-.059	.621
STREAM item 7	.714*	.401	.000	.891**	.390	.441	-.202	.714*	.516	-.195
STREAM item 8	.383	.548	-.582	-.286	.600	.629	-.473	.098	-.088	.289
STREAM item 9	.226	.070	.269	.601	-.127	.020	-.068	.261	.114	-.008
STREAM total	.668	.545	-.159	.594	.553	.401	-.213	.607	.027	.473

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 2: Multivariate analysis based on Pearson r correlations.

Educators' consideration for the institutional perspective

Figure 2 illustrates that four to five of the interventions classify as outperforming, whereas the others are progressive. In practice, this means that the progressive modules (PR, MOL, SE) are investing more effort into designing and delivering the module compared to previously. The multivariate analysis suggests that high efforts are linked to the educator's behavioural intention to use technology, $r(6) = .757$, $p < .05$, and potentially also her/his perceived usefulness of the technology $r(6) = .579$ (TAM BI and TAM PU). The progressive educator has a strong intrinsic motivation for educational development but is less concerned about efforts for her/himself, the institution, or the students. In the most progressive cases (PR, MOL) and the three most outperforming cases (MIB, MA, MB), the educator expressed a high level of motivation. For instance, the educators in MOL and PR expressed in the interview that technology was deeply interwoven in all aspects of the teaching and demonstrated a personal interest in using and developing technology. Furthermore, the educator in MOL developed a new digital tool tailored to the specific module, and the educator in PR used advanced digital tools long before any institutional ambitions for educational technology and TEL.

> 'Long before Blackboard, we made our own system for handling of materials and everything so it is a completely natural habit' (PR)

> 'There is practically no part of the module which is not completely interwoven with it [technology] and if we had to do without it, it would be a great setback'.

In both cases, the educational development was driven by a desire to support students' learning with technology-supported feedback. Although the effort was perceived as higher than the other cases, the educators did not express concerns related to the increased effort for themselves, their students, or the institution. Furthermore, the impact was higher compared to cases where a lower effort was invested. However, in the outperforming cases of the large-scale modules MA and MB, the educator expressed a dual motivation of having experienced the value of technology for supporting interaction between educator and students and an institutional perspective to reduce costs without lowering the quality of teaching.

> 'It is a way of establishing communication in a lecture hall … with 250 students… initially, the purpose was that we could rationalise without compromising the quality' (MA, MB).

In the interview, the educator did not distinguish between his own aim and the institutional demands. This indicates that the institutional perspective of having a sustainable balance between effort and impact was more important than the personal perspective.

In the third outperforming case MIB, the educator expressed that the purpose of using technology was solely to ease handling of assignments and communication for both educator and students. No personal aims were expressed, and the institutional perspective was related to student and educator effort. The effort to implement the intervention was considered low and the effort-impact balance therefore favourable.

In total, the cases illustrate an important connection between awareness of the institutional perspective and the introduction of TEL. It appears that educators with a high level of awareness of the institutional needs as well as a critical, balanced approach to the value of TEL focusing on specific aims are more likely to find an efficient balance between efforts and impacts of the intervention as well as sustain or improve this balance.

Educators' perceived usefulness of TEL

Another important aspect of the educator perspective is the educators' perceived usefulness and attitude towards technology in education. A high perceived usefulness and attitude is strongly correlated with STREAM item 6, respectively $r(6) = .738$ and $r(6) = .729$, $p < .05$, the usefulness is correlated with item 7, $r(6) = .714$, $p < .05$, and the usefulness is correlated with a high Learning Design impact, $r(6) = .866$, $p < 0.01$. In other words, educators with a more positive attitude towards and perceived usefulness of TEL are more likely to include online activities and reflection exercises as well as obtain a high impact.

Asked about their perceived relevance of TEL, some educators expressed a sceptical or reluctant attitude, emphasising that TEL is not superior to other tools and techniques used in their teaching. This was most clearly manifested by educators in MIB and SE and reflected in low TAM PU scores. In both cases, the educators stated that the technology had a limited potential:

> 'Handing in reports and correcting them is handled in Blackboard. This works well… [Quizzes and video] has no potential in relation to learning.' (MIB)

> 'I also use [technology] sometimes, but I also prefer to … stick to more traditional tools… [With a] computer but it's really not the same' (SE).

These two cases required less effort compared to previous deliveries and compared to, e.g., MOL and CB, where the educators expressed a more positive attitude towards TEL.

Educators' buy-in of TEL pedagogy

In general, none of the educators saw the technology in itself as a barrier and the data even show a negative correlation between perceived ease of use and positive attitude towards using technology, $r(6) = .755$, $p < .05$. However, the correlation between educators' perceived usefulness of the technology and STREAM items 2, 6, 7, and STREAM total suggests a connection between a large educator buy-in of TEL pedagogy (as represented by the various STREAM items) and impact. The more perceived usefulness of the technology, the larger STREAM compliance, $r(6) = .668$, and impact $r(6) = .866$, $r < .01$. That is to say, educators with a positive attitude towards TEL are likely to use more technology in their teaching and maintain a strong pedagogical focus (STREAM compliance) in their adoption of TEL. However, as the quotes and correlations show, strong technological skills do not ensure a positive attitude and buy-in of educational technology and TEL.

Students' buy-in of TEL

None of the STREAM design characteristics correlated with the students' perceived outcome, but the figures in Table 1 suggest a negative correlation between time on the VLE and the students' perceived outcome. However, this is somewhat in contrast to the actual general impact, which indicates that the higher STREAM compliance, the higher impact, and that in particular, the online reflection activities (item 7) were effective, $r(6) = .714$, $p < 0.05$. This highlights the importance of how the technology is actually used on the module, including the extent and purpose of VLE activities, as well as how the online activities are furthered to the students. The discrepancy between the perceived outcome and the actual impact suggests that the students may not be fully aware of the purpose and benefit of the online activities and that more introduction to the teaching format is needed that could support better use of the online activities as well as prepare students for similar modules.

Online structure with activities, reflection, and feedback

The structure of online activities and in particular online reflection exercises appear to have a potentially large influence on impacts. In general, designs that included online reflection exercises where the students were asked to reflect on their learning and understanding of the curriculum (STREAM item 7) had a strong correlation with a high impact, $r(6) = .714$, $p < .05$. Furthermore, the data suggest that out-of-class activities designed as an online process shifting between content and activities that activate the content (STREAM item 6) have a potential positive influence on impact, $r(6) = .570$. In addition, there is a strong correlation between Learning Design efficiency (magnitude) and the networked learning characteristic of supporting the feedback connection between the educator and the students (STREAM item 3), $r(6) = .917$, $p < .01$, i.e., that the '...educator and/or tutors provide online and/or in-class feedback on the out-of-class, online activities based on the generated data'.

Scale and reuse

Both the scale of the module (total ECTS), the modality (measured as STREAM compliance), and the number of deliveries influence the efficiency and thus also the sustainability. The intervention in MA and MB initially required a high effort from the educator and other staff, but the educator emphasised in the interview that the module delivery is now more efficient and flexible for both educators, students, and the institution compared to before the intervention.

> 'They [the modules MA and MB] are at least as good as the ones offered back then and it is with less staff involved'.

As MA and MB are large-scale modules (323–395 students) with high STREAM compliance and several reuses, the potential impact in terms of the number of students benefitting from the intervention compared to the required effort is extensive. This may also explain the reluctance in SE, and comparing the two small-scale modules (MI,

SE) there was no significant difference in students' perceived outcome and pass rates despite large differences in STREAM compliance. Thus, the scale and sustainability may also be a consequence of institutional requirements, such as the number of possible deliveries of the same design as well as the educator's influence. Educators with limited influence on a module and its later deliveries are potentially less encouraged to invest in redesigning the module.

Discussion and conclusions

To maintain high quality higher education without increasing costs dramatically, there is a pressing need for identifying design and delivery factors for efficient and sustainable teaching and learning practices. The article has identified six design and delivery factors for efficient and potentially also sustainable Learning Design interventions involving educational technology in science higher education. The factors are (1) educators' consideration for the institutional perspective; (2) educators perceived usefulness of TEL; (3) educators' buy-in of TEL pedagogy; (4) students' buy-in of TEL; (5) online structure with activities, reflection, and feedback; and (6) scale and reuse. Some of these factors are obvious, and, in particular, the latter of having a favourable balance between the efforts for designing and delivering TEL and its desirable impacts. For instance, the efforts may not be worth the trouble in small-scale and one-off module deliveries. The factors on the online structure and perceived usefulness of TEL seem obvious; however, it may give food for thoughts on how institutions promote and justify the use of educational technology to the educators and how the educators promote the technology to their students. It is less obvious that the cases that supported networked connections between the educator, students' activity, and the content correlated with a high Learning Design efficiency. Moreover, the study reveals that the educators' consideration for the institutional perspective is a strong predictor for an outperforming outcome and thus also an efficient Learning Design practice. How come some educators have this eye and commitment for the institutional perspective while others do not?

All in all, the study suggests that the professional development of educators plays an important role in building a sustainable Learning Design practice. But the study also suggests that TEL teaching competencies are not enough. Educators should embrace the idea of an efficient, reusable teaching practice where efforts are counterbalanced by the impacts over time. In addition, educators must buy-in on the potential, purpose, and pedagogy of TEL and maintain its pedagogical qualities in their teaching practice with activities, reflection, and feedback (e.g., as provided by the STREAM model and the characteristics of networked learning). The latter is interesting from a networked learning perspective, as STREAM item 2 and 3 promote online activities designed to provide data to the educator about the students' learning as well as the educators' feedback on students' online activities, and that they were (strongly) correlated with a high Learning Design efficiency. Thus, the design process must provide support and information to sceptical educators, clarify and justify the purpose of TEL, and can benefit from managerial and local teaching community support.

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Surveillance and datafication in higher education: documentation of the human

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Abstract

It has become a commonplace in educational research and policy discourses to state that digital technology has 'transformed' the nature of higher education, and even the university itself, leading to what is claimed to be more interactive or less hierarchical formats and engagement, in which traditional modes of teaching such as the lecture, are claimed to be obsolete. These narratives, arguably, express a widespread desire for 'transformation' in the university. In terms of digital education, this has been expressed variously in the apparently benign ideologies of 'active learning', 'connectivism', and 'the flipped classroom', all of which share common values, those which prize student interaction, and observable engagement, both online and in the face-to-face setting. Although these constructs appear to be 'student centred' and progressive, critics (e.g. Macfarlane 2017) have pointed out that an emphasis on student performance of a particular form of engagement and identity in higher education may in fact threaten the fundamental values of academic freedom. In parallel, regimes of audit concerning academic performance have become more prevalent in higher education, with metrics measuring publications and impact becoming more influential on academic careers. I have argued elsewhere (Author 2020) that this tendency is greater in the context of digital education, where performativity, surveillance and regulation are intensified via digital technologies, as part of a broader 'culture of surveillance' in society (Lyon 2018). As recent commentators have argued (e.g. Williamson 2017a), the increased use of big data to track and monitor student activity, has the effect of 'datafying' them as human subjects; the same could be said for the technology of the h-index for academics. In this paper I will combine insights of digital education research, science and technology studies and information science in order to interrogate the nature and effects of this increased 'datafication' of higher education, looking at two examples; learner analytics and the author publication metric h-index. I will argue that these two digitally-mediated 'documenting' practices share several features; they have a supervisory or surveilling function, they are underpinned by particular ideologies, and they carry normative force regarding the nature of 'desirable' subjectivities and practices. I conclude that there is a need to sustain a critical agenda of research around these technologies of surveillance and documentation, particularly in the current context in which 'discourses of inevitability' surrounding digitisation of higher education prevail.

Keywords

Surveillance, datafication, learning analytics, publication metrics, algorithms, sociotechnical imaginaries

Introduction

It has become a commonplace in educational research and policy discourses to state that digital technology has 'transformed' the nature of higher education, and even the university itself, leading to what is claimed to be more interactive or less hierarchical formats and engagement, in which traditional modes of teaching such as the lecture, are claimed to be obsolete. These narratives, arguably, express a widespread desire for 'transformation' in the university. In terms of digital education, this has been expressed variously in the apparently benign ideologies of 'active learning', 'connectivism', and 'the flipped classroom', all of which share common values, those which prize student interaction, and observable engagement, both online and in the face-to-face setting. Although these constructs appear to be 'student centred' and progressive, critics (e.g. Macfarlane 2017) have pointed out that an emphasis on student performance of a particular form of engagement and identity in higher education may in fact threaten the fundamental values of academic freedom. I have argued elsewhere (Author 2020) that this tendency is greater in the context of digital education, where performativity, surveillance and regulation is intensified via digital technologies, as part of a broader 'culture of surveillance' in society (Lyon 2018). As recent commentators

have argued (e.g. Williamson 2017a), the increased use of big data to track and monitor student activity, has the effect of 'datafying' them as human subjects.

As I have contended (Author 2020), this tendency towards datafication arises from a very particular set of ideas about the university in the digital age. This centres on notions of academics and students as somewhat abstract, disembodied human subjects, removed from their social and material settings. It can be argued that digital technology is used here to express fantasies of human transcendence in higher education, and promote notions of extensions of human intellectual and embodied capacity. These ideas, form part of a web of highly contradictory notions about the ontological status of the student, the lecturer, the text, the university, and knowledge itself. Utopian desires for extended human agency, untrammelled by the 'confines' of embodiment, time and materiality sit alongside increasingly prevalent digitally-mediated regimes of surveillance and control in university settings. As algorithms play an increasingly all-pervasive role in society (e.g. Finn 2017, Cheney-Lippold 2017), 'big data' has become an increasingly important in education (Williamson 2017a), and 'learning analytics' is one such tendency; a growing approach to the monitoring of student activity online which, while justified in terms of 'student support' and the promotion of vulnerable and disadvantaged groups, may in fact be regarded as primarily driven by the logics of national audit systems imposed on higher education. Meanwhile, all dimensions of academic practice are increasingly made subject to performative regimes of surveillance, as can be seen in the UK-based "Research Excellence Framework' and 'Teaching Excellence Framework'. The marketized model of higher education arguably demands this level of surveillance, in order to record, document and make visible aspects of study, practices and subject positions, which were hitherto not amenable to observation and audit. Digital technology, has been co-opted as the primary site of surveillance, in which embodied, ephemeral and copresent epistemic practices at the heart of educational process – face-to-face teaching, reading, independent study - are subject to processes which ultimately render them not only as data, but also as *documents*.

This is an area of educational practice which has not received a great of critical scrutiny, but instead has tended to be viewed in the educational literature somewhat uncritically, and assumed to represent straightforward 'progress', a tendency which is commonplace in educational technology more broadly. Critical work has emerged in recent years, which has begun to interrogate the role of datafication in education (e.g. Williamson 2017a); there is arguably a need for this valuable strand of work to look in more detail at higher education, and particularly the effects of datafication on the day-to-day life and practices in the university. Instead, the focus has tended to be at the level of systems. Where work has looked at the effect on students or academic practices, the focus has tended to be on gauging efficacy, as opposed to investigating the complex lived effects of digitisation and datafication. Additionally, there has been very little attention paid to the interplay between human and nonhuman agency resulting from datafication, at the level of practices.

Datafication and informative material objects

Writing from a new materialist perspective, Kosciejew (2017) proposes the concept of *material-documentary literacy*, reminding us that one of the main functions of documentation is to materialize information. He points out that 'information' is commonly regarded as being an abstract, dematerialized entity, and there is a distancing from its materiality, which is regarded as secondary. In contrast, he foregrounds the materiality of documentation, in order to '…help (re)configure our understanding of information, as something not immaterial and intangible, but something material and tangible' (Kosciejew 2017: 97). Kosciejew also focuses on how documentation science '…can illuminate bureaucratic tentacles that actually do, in a material sense, reach into and control ordinary lives, helping to ensure the effective functioning of governance and governmentality and to manage embodied subjectivities.' (Kosciejew 2017: 98). He emphasizes the centrality and ubiquity of documents to contemporary life, also suggesting that their very ubiquity and apparent banality causes us to be inured to them. He points out that documents do not merely record, they are *constitutive*. For him, 'A document does more than reconstitute. It constitutes different things, such as ideas or entities and materializes them in order that they can be analysed, classified, placed, routinized, viewed, and used.' (Kosciejew 2017: 101).

He cites Breit's (1951) example of the antelope as document. Breit asks us - in a compelling manner - to consider the case of an antelope which is captured in Africa, brought to Europe, put in a zoo and examined by experts, and also members of the public. She argues that the zoo in this case is effectively a laboratory in which the antelope is analyzed, displayed and discussed like a document. As Kosciejew puts it, 'On its own, the antelope is just an antelope; however, when these material assemblages and components surround it, it becomes a document.' (Kosciejew 2017: 101). Breit refers to it as a 'catalogued antelope' (Breit 1951: 11), from which a series of secondary documents are derived. Kosciejew goes on to propose that in the field of library and information science,

documentation has been neglected, and information has been regarded as more important. This has led, he argues, to a conceptualization of information as either immaterial, or at least separate from its material instantiation. He also refers to Orom (2007), who argues that this shift towards information is a result of increased interest in digital technologies, and also the increased prominence of the concept of information processing in cognitive science. Orom argues that this emphasis has spread across society more broadly, including into the academic disciplines. He contends that we should shift 'the object of study from mental phenomena of ideas, facts and opinion, to social phenomena of communication, documents and memory institutions.' (Orom 2007:58, in Kosciejew 2017: 105), in particular the study of *informative material objects*. This provides a conceptual starting point with which to examine the phenomenon of datafication in higher education in a manner which avoids the limitations of mainstream analyses in educational research so far. The concept of the *informative material object* allows us to analyse information and data as material phenomena which are embedded in specific sociomaterial instantiations, and enmeshed with human agency. This contrasts with the dominant paradigm of data and information being abstract, disembodied entities. This is a subtle but important distinction which moves the focus onto the entanglement of human, material, digital and analogue agency which constitutes the 'datafied' university.

Learning analytics as a documenting practice

In order to provide an illustrative example, the next section I will examine a specific case of datafication; 'learning analytics'. Learning analytics is described as follows in the executive summary of a review document produced by the UK government agency the Joint Information Services Committee (JISC):

> Every time a student interacts with their university - be that going to the library, logging into their virtual learning environment or submitting assessments online – they leave behind a digital footprint. Learning analytics is the process of using this data to improve learning and teaching. Learning analytics refers to the measurement, collection, analysis and reporting of data about the progress of learners and he contexts in which learning takes place. Using the increasing availability of big datasets round learner activity and digital footprints left by student activity in learning environments, learning analytics takes us further than data currently available can. (Sclater *et al* 2016, p4)

What is immediately of interest in this introduction is the mention of the 'digital footprint', with the emphasis on the *documenting* of the footprint, and the corralling of the student's steps. The JISC document makes a case for the expansion of the use of learning analytics in UK universities, suggesting four main uses, the first of which is 'as a tool for quality assurance and quality improvement with… many institutions proactively using learning analytics as a diagnostic tool' in the context of the state-run audit the Teaching Excellence Framework, in order to demonstrate compliance with this framework (Sclater *et al* 2016: 5). However, what is not discussed is how the pedagogic relationship between the teacher and student, where problems may have previously been identified and addressed by the teacher, has effectively been 'contracted out' to the technology, in response to massification of the system. It also shifts the locus of student engagement fully, or in large part, over to the digital setting of the virtual learning environment, requiring intensive engagement in that as a primary, or even sole, marker of student engagement in general. Although this type of analysis may indeed have utility in identifying students who have disengaged, it would also render a student who chooses to work offline as deviant, or in need of remediation. The use of learning analytics risks making displays of interaction in VLE discussion boards a formal requirement.

There are however, critical voices in the educational literature, and commentators who seek to establish a more nuanced understanding of the effects of learning analytics. Jandric *et al* (2017) recognise the complexity of agencies, stating that in education studies '…algorithmic cultures signal a shift away from the centrality of individual or social concerns and toward the complex relations between the human and nonhuman agencies that proliferate our digitally networked activities.' (Jandric *et al* 2017: 101). Williamson flags up the political and economic implications, (2017b) pointing out that educational data science has become a 'trans-sector enterprise', with ownership and power moving over to commercial vendors. He identifies learning analytics as arising from a 'sociotechnical imaginary' (Jasanoff 2015), and defines these imaginaries as '…socially shared visions of technologically mediated progress, that have moved from single inspired individuals to much wider communities and fields of action.' (Williamson 2017b: 107). He argues that educational data science is driven by such an imaginary regarding the future of educational research, leading to claims of a 'paradigm shift' towards a position which assumes '…the inherent truthfulness and unbiased, impartial agnosticism of numbers' (Williamson 2017b: 109). This goes hand-in-hand, he argues, with a disavowal of any need for educational theory, as the data are seen as able to 'speak for themselves'.

Prinsloo (2017) also looks at this sociotechnical imaginary, framing his critique explicitly in terms of student surveillance. He refers to Latour (2012), who proposes that, in relation to the design and development of technologies, '…unintended consequences are part and parcel of any action.' (Latour 2012: 25, in Prinsloo 2017: 139). Prinsloo explores our relationship to algorithms, comparing it to that of Frankenstein to the monster he created, following Latour. He also references the 'claustrophobic maze' (*loc cit*) of Kafka's 'Trial', in which the protagonist finds himself trapped in a world with no way out, comparing this to a bureaucratic organization in possession of a large body of information about those within its ambit, such as a university using learning analytics. He refers to the concept of *algocracy*, coined by Aneesh (2006, 2009), in which '…code appears to have…taken over the managerial function of supervision and guidance' (Aneesh 2009: 355). Prinsloo explores in his paper the conditions in which algorithmic decision-making may collapse into *algocracy*. In educational settings, algorithms underpin learning analytics, as he reminds us. He quotes Williamson *et al* (2014), who warn that '…[the] algorithms that enable learning analytics appear to be 'theory-free' but are loaded with political and epistemological assumptions. The data visualisations produced by learning analytics – data dashboards as they are frequently described - also act semiotically to create meanings.' Prinsloo points out the prevalence of referring to algorithms in terms of human knowing and intentionality, by way of anthropomorphic metaphors such as 'knowing' or 'acting' (Dijkstra 1985). Turning to education, he reminds us that algorithms should not be regarded as neutral technical entities, but are themselves both normative and political. He describes how human agency is encoded into them (Introna 2011), and how that encoding '… becomes part of organisational architecture and shapes/informs/enacts decision-making that in turn shapes and informs human lives' (Prinsloo 2017: 143), in particular the power of algorithms to prioritise what is to be regarded as important, and what should be visible. As Beer puts it, 'Algorithms 'govern' because they have the power to structure possibilities.' (Beer 2017: 97). Prinsloo sets out how increased digitization has combined with the proliferation of regimes of audit and quality, to lead to greater use of algorithmic decision-making in higher education. For him, learning analytics is '…a *structuring* device. It is not neutral. It is informed by current beliefs about what counts as knowledge and learning' (Prinsloo 2017: 145).

What is of relevance here is the process by which learner analytics operates, and in particular – I suggest – how it both documents the student, rendering the *student as document* in Kosciejew's terms. Here we see students under surveillance and subject to ideological and normative force, and expected to exhibit certain types of behaviour and engagement in support of these ideologies. It is not sufficient for this behaviour to take place, in must also be observable, and ideally recordable. In addition to approved 'teaching and learning' behaviours, there are a range of other surveillance practices which have become prevalent in contemporary higher education, as Macfarlane (2017) points out. Returning to Kosciejew's analysis, it could be argued that the students themselves are datafied through the processes of learning analytics and the *algocracy*. However, I would suggest, that this is not merely a process of documentation, with all the ethical complexities discussed by Prinsloo and others. I contend that its effect is more far-reaching, serious, and fundamental - in that learning analytics, in my view, alters the very ontological status of the student, who unwittingly becomes a digital document. The student's ontological status, her being, is in a sense contaminated, by this intervention, and she can no longer exist outside of the baroque entanglements of digital surveillance, rather like Breit's antelope in the zoo. The next section will consider a further example of datafication in higher education, with an analysis of the author-level metric h-index.

The h-index as a documenting practice

The 'h-index' is an author-level metric which was proposed by Hirsch (2005) as a means by which to measure productivity and citation impact. An h-index is the largest number h, such that h articles each have h citations – for example, if an author has 15 papers of which 10 have been cited 10 times, their h-index is 10. In evaluative bibliometrics, measuring performance at the micro-level of the individual is regarded as problematic, as the individuals' output may not be sufficiently large as to obtain statistically reliable indicators, and also for the reason research productivity, publication numbers and citation impact are not necessarily correlated variables (Glanzel, 2006, Bornmann & Daniel 2007).

However, despite these shortcomings, the h-index was quickly adopted by the scientific community (e.g. Ball 2005) has become a commonly-used metric to measure academic achievement which can be calculated by setting up an account via Google Scholar, and may be referred to in applications for tenure, academic promotion and funding. Returning to the critiques of learning analytics above, we can analyse the h-index in terms of Williamson's (2017b) application of Jasanoff's (2015) *sociotechnical imaginary*. His positing of a 'paradigm shift' towards a position which assumes '…the inherent truthfulness and unbiased, impartial agnosticism of numbers' (Williamson 2017b: 109) may also apply to this case; in which the complexities of an individual's publication career which has

unfolded within the complex contexts, epistemologies and conventions of a particular discipline, and also within the context of that individual's particularly material and embodied life as an academic and also a human being, are subject to a reductive methodology which results in a single numerical score. As the metric favours a large number of papers which have garnered roughly equal numbers of citations which have arisen relatively quickly after a paper has been published, as opposed to a writing career which has resulted in a small number of very highly cited pieces, or one in which there have been bursts of activity, punctuated with periods where productivity has been lower. This might be seen with female academics who have taken maternity leave, for example, or early career academics on peripatetic contracts who have not been able to avail themselves of the funding, resources or time required to consistently publish to the pattern demanded by the h-index. Members of marginalised groups within academia may not be brought in to powerful networks of publishing senior scholars, through discrimination or exclusion. Speakers of languages other than English may not be in a position to attract the numbers of citations as English-language publications can. National and institutional contexts where digital technology and library access is limited may also serve to blunt the distribution of papers by certain authors. It can be argued then that although the h-index purports to demonstrate 'impartial agnosticism', it carries within it an ideology and values relating to what makes a 'successful' academic career, and what constitutes 'impact'. The *imaginary* is one of an implicitly privileged scholar working in a position of high professional security and prestige, shielded from the pressures and blocks to success listed above. It is also arguable an *imaginary* based on the assumption of scientific publishing practices, as opposed to the slow scholarship of humanities academics, who may be working as lone scholars on books which may take several years to produce.

Turning to Prinsloo's (2017) application of Aneesh (2006, 2009), we can consider whether the h-index is an instance in which '…code appears to have…taken over the managerial function of supervision and guidance' (Aneesh 2009: 355). The relationship between a scholar and the h-index is somewhat different to that of a student to a learning analytics platform, in that the scholar may choose whether to set up a Google Scholar profile or other means of deriving their score. The h-index, unlike the learning analytics technology used within a university, does not represent a particular authority, or form part of an assessment process per se. However, it is commonly referred to in promotions and funding applications, and in that regard may be seen as part of assessment of performance in a broader sense, and so might be deemed to have a 'supervisory' function. In terms of 'guidance', it is worth considering the normative effect that the h-index may have, insofar as it may shape authorial decision-making regarding the type of paper which will be written and when, and may also lead to a 'gaming' of the system or cronyism amongst associates, in order to boost one's score. In that respect, the h-index may be implicated in 'guidance' which privileges performance, along the lines discussed above. It is therefore, an algorithmic practice which is both political and normative, as Prinsloo proposes. Like learning analytics, the h-index '… becomes part of organisational architecture and shapes/informs/enacts decision-making that in turn shapes and informs human lives' (Prinsloo 2017: 143), structuring what comes to be seen as important, and what is made visible.

Returning to Kosciejew (2017) the h-index may also be seen as a documenting practice, in that the individual is rendered into what is effectively a report, which may be viewed on the screen. The embodied, intricate, extended and messy mature of academic writing, the data collected, the communities enaged with, the travel, the time spent, the reading, the emotions experienced, the interactions engaged with – all the complexity, mess and struggle of every academic paper or book published by that individual is reduced not only to the resulantatn published text, but that text is further reduced to a score. These are combined to produce a score which refers not to texts, but to the human author who has produced these. The scholar is then displayed online for all to see, rather like Briet's antelope which was rendered into a document by quantification, analysis and display in the zoo.

Discussion and conclusions

This paper has considered critical literature which has looked at datafication and the effects of algorithmic practices in education, also drawing on the concept of the *sociotechnical imaginary* (Jasanoff 2015) from science and technology studies, and Kosciejew's (2017) concept of *documentation* taken from library and information sciences. These theoretical perspectives were used to consider the nature of two datafying technologies in higher education and academia; learning analytics and the h-index metric. I argued that despite important differences, both of these technologies share features discussed in the literature; they both act as vehicles and rivers of particularly ideological position regarding what constitutes 'good' performance. They are both necessarily reductive, and in that act of reduction inevitably they 'tidy up' the extensive sociomaterial, embodied, political and complex realities of academic engagement and writing. In both cases, what can be observed and recorded is what comes to stand as proxy for what took place, stripping out aspects of engagement which are private, unseen, relational, or ephemeral. The technologies have a normative force, not only recording practices but also

normatively structuring them. The messy realities of lives and practices are also tidied up and packaged, rendering the individuals into *documents* which are then open to scrutiny.

It might be argued that any form of quantification of human activity is necessarily reductive, but the question then arises as to whether the reduction is necessary. In the case of student engagement, the case for learning analytics is far from clear, and it may be argued that the distorting effect of the process not only fails to recognise important aspects of the experience of study, but also does damage to student epistemological practices through normative distortion. The same might be argued for the h-index; in that its operation as a proxy for not only epistemic and writing practices, but also for the individual, may lead to not only an impoverished imaginary of the knowledge practices and meaning-making, but also to actual damage to the pursuit of knowledge through forces of normativity, standardisation and performativity. For these reasons, I contend that 'discourses of inevitability' surrounding the use of technologies of datafication, surveillance and audit in higher education should be resisted, in order to keep in check these tendencies towards documentation which may ultimately undermine the richness, variety, complexity and ephemerality of scholarship itself.

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Emerging Networks - A study on learning networks during the Covid-19 lockdown

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Abstract

This paper discusses findings from an investigation of students' experiences from and participation in different learning networks during the Covid19-lockdown. The investigation is based on empirical data in the form of 32 interviews with students from a variety of University College Programmes (business-, administration-, construction-, technology-, health-, pedagogy- and teacher education). The interviews were collected as part of a larger study, where data also consisted of responses to surveys from, potentially, 84000 students. In the interviews, the students shared their experiences regarding learning and teaching online, respectively. Three cases were singled out aiming to maintain a high degree of complexity and maximum variation. Through the contemporary theories within the field of Networked Learning, we aim to show examples of how the students were networked during the Covid-19 shutdown and the implications that emerging networks had on their participation in online educational activities. Furthermore, we wish to make a suggestion for the use of the applied categorisation of networks for analyzing how students are networked. These categories, presented in this paper, are proposed by researchers within the field. The main findings suggest that online teaching during the lockdown required students to establish new patterns of participation, thus, establishing new structures and ways to collaborate. This led to emerging networks supporting different aspects of their life setting as students and creating opportunities for engaging in new social configurations and learning.

Keywords

Networked Learning; Patterns of Participation; Higher Education; Empirical Research; Analytical Framework

A Covid-19 Lockdown Study

On the 11th of March 2020, all higher learning institutions in Denmark were closed by the Danish government due to the Covid-19 pandemic. On a very short note, all educational activities had to be transformed into online activities. This, in short, meant that future participation and collaborations had to take place in online virtual environments, whether students had previous experiences or not. The rapid change offered researchers a chance to study the changes that occurred, and the implications on students' learning practices.

In June 2020, a mixed methods research study on online teaching across universities and university colleges was conducted (Georgsen & Qvortrup, 2021). 84000 students shared their experiences regarding learning and teaching respectively in a survey and further 32 students subsequently participated in interviews. The interviews focussed on how students managed to establish a learning site in their homes and on their individual personal experiences e.g., challenges and potentials regarding online participation in courses. Overall findings from the survey and interviews suggest that the quality and level of activity decreased during the period. The report further outlines that a plausible reason for this is the change of demands and requirements, that participation in online learning

environments imposes on the learners, and that ways to engage and participate as a community need to be renegotiated and reconfigured (Georgsen & Qvortrup, 2021).

Research question

Much research has been done on online teaching and learning both before and after the Covid-19 lockdown. As highlighted by MacKenzie et al. (2021) responding to The Manifesto for Teaching Online (Bayne et al., 2020) the predicaments of online teaching as well as it's potentials have continuously changed in connections to new technological opportunities and new ways to think about online education (Cleveland-Innes & Ostashewski, 2019; Hrastinski, 2022). The contribution of this paper is an investigation into how students experienced the move from everyday learning to participate in fully online learning networks. The research question that guided was: *How do digital networks emerge, and support learning processes and which types of networks do the students participate in as part of their learning trajectory during the Covid19-lockdown?*

Learning in a networked world

The understanding of networked learning being advocated for in this paper and guiding the data analysis alludes to the often-used definition within the Networked Learning community as "learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources" (Goodyear et al., 2004). As de Laat and Ryberg (2018) stress, this definition highlights the importance of both human and digitally mediated participation. Networked learning is characterized by the notion of learning through and by "connections" and "connectedness" underlining that mere interactions with technologies and resources in isolation are not sufficient to fit within the definition. Networked learning calls for connectivity that may change the actors in the network and not only exchange information, which is what the term 'translation' describes in Actor-Network Theory (Latour, 2005).
The analysis provided in this paper is not focusing on the topology of the network, but rather, on the exchanges, hierarchies, and interactions in the network. We further deploy Jones' definition of networked learning (Jones, 2015, p. 241) emphasising the shared experience of solving problems and learning in a community that is facilitated by digital networks. In this sense, the "network" in networked learning consists of actors, both human and non-human, who contribute to the manifestation of the network and to the exchanges within the network.

Method

This study builds data from 32 interviews that was conducted as the qualitative part of a mixed-methods research study on online teaching during the Covid-19 lockdown with the participation of nine higher education institutions in Denmark (Georgsen & Qvortrup, 2021). The interviews were conducted after the lock-down in the period mid-September to the end of October 2020. The 32 students were interviewed individually each of approx. one hour duration. Participants for the interviews were selected strategically on the basis of their answers in a survey, with the aim of achieving a spread on two parameters: academic subject area and attitude towards online teaching (Georgsen & Qvortrup, 2021). Though the survey is not directly included in this paper, it functions as a subordinate backdrop. The interviews were semi-structured (Kvale & Brinkmann, 2018) with questions focusing on the students' experiences with online teaching, perceived learning outcomes and how they managed to establish a learning site in their home. The interviews were recorded and verbatim transcribed in Danish. To utilise significant passages from the interviews in this paper quotes were selected, condensed, and translated into English.

Our analytical approach involves what Bryman (2016), and Schwartz-Shea and Dvora (2012) describe as an abductive strategy, where identified 'disturbances' in the ways the students' experience being part of networks are used to suggest further exploration. Initially, the interviews were analyzed by deploying an exploratory coding strategy focusing on the students individually developed strategies and competencies, on group structures, their collaboration with fellow students, on how the students meet the conditions, requirements, and opportunities that the situation placed on them. A case study approach (Yin, 2018; Flyvbjerg, 2010), was conducted in order to process and relate the interview data systematically to the complex phenomena of learning networks while maintaining an exploratory approach. During this work (Bryman, 2016), the distinction between network as *people, situations or context, infrastructure* and as an *actant* itself, as proposed by Dohn et al (2018), was chosen as a relevant analytical approach. By looking across the four types of networks, it became possible to contribute with knowledge about the position each type of network occupies for specific participants. The authors further developed and operationalized the categories as units of analysis in the following way:

Category 1 (C1): Students' participation in a network of people: Is used to map the people included in the students' network learning strategies. It is introduced as a reference to network the students participate in, during their learning process along with other people. These networks can be formal as well as informal and include both peers, classmates, study-group members, educators, university college and 'strangers'.
Category 2 (C2): Students' participation in a network of situations or contexts: Sheds light on how students resituate knowledge and patterns of participation in new situations and contexts. Information or communication technologies or learning management systems as well as other means can support this process, but they are not the focus of this investigation. It is introduced as a reference to the learning that arises from connections between situations and contexts such as class, courses, study groups or other situations facilitated by the university.
Category 3 (C3): Students' participation in a network of ICT infrastructure: Focuses on perspectives on the ICT mediation of learning, computer-supported collaborative learning (CSCL), enabling connections across space and time.
Category 4 (C4): Students' participation in a network where the network is an actant itself: Emphasizes students' socio-material entanglement with objects and other people. Informal: Greater networks of 'strangers' in non-institution platforms – e.g. organised by hashtags or handles. Inspired by notions of the 'rhizome', 'line of flight' and 'plateaus of intensity' (Deleuze & Guattari, 1987, p. 22).

Table 1: Own development, inspired by Dohn et al. (2018).

A second reading was now conducted, distinguishing between the four network types, and three cases showing in different ways how students were networked during the Covid-19 lockdown were singled out, prioritizing diversity regarding the learning trajectories the students followed during the Covid19-lockdown, the kind of networks represented by the students, and how the networks appear to have supported their learning. The three cases represent great variation aiming to maintain a high degree of complexity and maximum variation in the analyzes (Flyvbjerg, 2006). Furthermore, this perspective was not investigated as the report by Georgsen and Qvortrup (2021) didn't focus on students' strategies for participating in learning networks.

Case 1: Disturbed and expanded learning networks

In the first case, we are introduced to "Anna" who follows a Bachelor of Public Administration programme, that is offered both as an on-campus and as an online program. Anna is following the online program, and as the Covid-19 lockdown applied, she was already used to attending online classes and the most radical change was that the fellow students who used to attend classes on-campus were now attending the online classes as well. Due to the lockdown, however, a new practice and context for group work - breakout rooms - was introduced expanding the network of online participants. Anna was first skeptical to this change as she preferred to stick to an already established, and for her important network - her study-group:

> In my study group, we know each other really well and we know what happens in each other's private life and such, and maybe we actually know each other better I think than if we had met each other on campus.

Another point of attention expressed by Anna was that the requirements for studying online are different from participating in courses on campus:

> It requires more self-discipline and yes it just generally requires a little more (...) You really must be present when you are online, because if you're mentally *checked out* then you miss pretty much.

When asked about participation and group work in online classes, right after the lockdown Anna explains that there was a clear split between, what she refers to as 'the online'ers' and the 'the others'. As the lockdown proceeds, the situation, however, seems to change for Anna:

> In the second module, we were put more out in mixed groups and got to know some of the others actually. So, there was also small talk, i.e. when we had to do assignments. So, you got to chat a bit about something else as well, and that is what we also did in the study group, right?

The case shows a student, who sees herself as primarily networked within an important network of people (C1) - her study group. During the lockdown, this well-known network was both expanded and experienced to be invaded by 'the others' leading to uncertainties. Further, the boundaries between the students following the program online and students that participate in the program on campus, was initially reproduced in the now joint online setting, and breakout rooms are emphasized as a context (C2), that supported her in getting acquainted with the students she didn't already know from the online setting. The breakout rooms are comprehended as actants in themselves (C4), as the process of establishing these new online groups are proposed to offer a particularly suitable structure for novel collaborations.

Anna emphasizes structure, routines, and people as equally important when it comes to being connected to her study group. In her opinion, her study group benefited from already being an online network, while the introduction of breakout rooms is experienced as a new way of framing collaboration. Even though Anna perceives the breakout room sessions as an opportunity to be connected with students she was not previously connected to, she also finds it to be a connectedness that requires a surplus of mental energy from her. One explanation offered by Anna is that it requires extra effort and self-discipline to establish and participate in an online study group e.g., endurance, focus and high attention to one's learning strategy. Anna points out that the challenge was even greater for 'the others', who were not used to online teaching and who had not yet - unlike Anna - developed personal online learning strategies.

Case 2: Learning network supporting the development of professional skills

In the second case, we meet "Jane" who is enrolled in a 2-year Academy Profession programme in Computer science and is a skilled and experienced participant in several types of learning networks. Jane's overall perception of her study life during the lockdown is very positive and she doesn't find online teaching as more demanding than her usual everyday study life.

Jane has a very specific view on the role of the learning networks and her part in them:

> Many [of my fellow students] think that we are missing a bit when it comes to the social part of studying, but I must admit, that I am not here for the social…I think this [lockdown] has empowered me in terms of not being afraid of having to take jobs online.

Throughout the interview it becomes clear that for Jane the network and the people in it serve as a structure for engaging in the content of the course and the development of professional skills (C1) such as e.g., being trained in moving in and out of various online settings, participating in different ways, introduced to new mediating teaching tools, or forced to find solutions to problems in relation to database connections. Furthermore, Jane seems to have a special focus on establishing clear structures for cooperation within her study-group (C1):

> It worked super well because we structured the day well. …When a task was given, we jumped into our [Discord]channel. Then we can share if there is something we struggle with. I think we're pretty good at it. We work super well together. We are a very good match" ... If I pose a question in our chat channel during the afternoon or evening, then there is an answer as soon as one of them [participants] are online.

Jane is not using Discord to be social but perceives Discord as an effective platform for learning (C3). On the same note, Jane explains how it was obvious for her learning network (the study group) to connect over Discord, as they already used it as a communication platform in the class. It is not only the study group that appears as a central actor, so does the joint Discord channel as an agent that is characterized as a part of a super good match. Here, Discord serves as an essential infrastructure that enables connections across space and time.I It is perceived as a flexible and relevant context that facilitates her learning process during the lockdown, in a way that is different from her experience with learning on campus.
Jane also mentions Zoom as an important ICT infrastructure, by which the educator could support the students through synchronous screen sharing, drawing tools and organizations in sub-groups. Again, the study group emerges as an important network that adds support to Jane's learning process. While PowerPoint is a well-known presentation software that Jane recognizes and is familiar with from classes on campus, the video conference system features were new to her. And her favourite system was Zoom (C3), as the affordances, it has to offer to support her learning approach. The Zoom infrastructure becomes a central focal point that enables Jane to commit to the academic content and establishes a situation where she is networked to both educators, fellow students, and

the academic program at the same time. Jane appreciates being able to act intuitively during class, to be able to ask questions or ask the educator to elaborate on issues if she is in doubt or does not immediately understand the professional aspects taught. This strategy seems to be essential for her way of participating, as she appears to be very energetic. Precisely the connection to the profession and the professional elements appears to be particularly important to Jane and as she experiences that development of online learning strategies to a great extent, equips her for her future profession, she gets even more motivated. Though her motivation for participating does not seem to be driven by the desire or ambition to connect socially with her fellow peers.

Case 3: Instagram as a learning network agent

In this case, we are introduced to 'Kate', who studies nursing. During the interview, Kate explicates that one of the challenges she faced during the lockdown, was related to the social aspects of her life as a student. During the lockdown, Kate, therefore, starts to post content related to a hashtag on Instagram:

> [...] to form a relationship with the followers we now have [in Instagram], I started the theme 'A day in my life under the corona'.

Kate starts to share her everyday stories, challenges, and experiences on life as an online nursing student during the lock-down under the hashtag: 'Follow [student name] for a day' on Instagram intending to nest and nurture social interaction:

> It [the posts] was a lot of this, well, I must have group work now, and I must have a lecture now, and then all these things, and how I read homework and stuff like that, so you could kind of motivate each other, uh, so you just could get that little kick you might need.

Later in the interview Kate continuous:

> When you are in such a situation [lockdown], I just think that relating to someone on the same level [peers], uh, commenting on what kind of coping they kind of do. That's why I took the initiative.

Kate explains that the university provided a space in Teams named 'homework support', and that this space was intended for homework support and socializing (C3). However, only an average of 5 students participated. Kate explains that she hesitated to participate, as she found it a slight hassle. While Teams is a learning platform designed to support communicative needs in learning processes in a hierarchical network, social media platforms are designed to support spontaneous needs for communication in ahierachical, nondemocratic ways. This also goes for Instagram, which as a network is characterized by the symmetry between human and non-human actors, where the ease and frequency of participation, thus, defines the power of it.

> But [in Instagram] we have actually got a lot of followers [...] right now we have 300 followers. It's far, far more than there are on teams and it's far more than the five [students] that were to… for the homework cafe [in teams]. [...] Well, it's just because we have institutional IT [...], and then we have this parallel track, right.

Kate explains that the intention with this common hashtag was to establish an online facility, where she and her fellow nursing students could share everyday 'lockdown moments' and promote academic dialogue organised through hashtags.
During the lockdown this social network became more systematic and formalized through a weekly, designated student 'take-over':

> We called it "follow this class for a day" or "follow this student for a day" or "Follow Kate, fourth-semester student for a day". [...] Then I posted something, personal or academic, and received a lot of comments and feedback. And it was really good, it engaged people.

The network reached 300 contributors and since the network was organised through hashtags and a shared handle many of the contributions were from 'strangers', such as nursing students from other University Colleges. A condition for the emergence of the network was that the contributors were equally important and that the network relied solely on their participation. Kate explains that she thinks the success of the activities relied on the convenience and ease of contributing. This leads her to suggest, that the university could apply similar strategies:

> I think they should use us, the students, as a means to reach more co-students than they can. Uh, because there have been a lot of monologues in relation to what they're conveying to us. I also think we could contribute a lot and then make a really good collaboration out of it instead. Uh, so I think that would be using us as a resource instead.

Here, Instagram is positioned as a non-human actor in the network, not only did it provide the necessary infrastructure (hashtags and handles) for the learning network (C4) it also played a significant role as a facilitator of the network's outreach and accessibility. The hashtag and the handle became a plateau for various, organically emerging interests for networking such as social sharing, expanding connections and academic support. This Instagram network did not only become an academic community in which students could engage in comment/ reply to threads, but it also facilitated connectedness established through the sharing of feelings of seclusion and loneliness.

Discussions and conclusions

From a general perspective, the cases above represent a variety of ways the students were networked during the covid-lockdown and how different patterns of participation were applied to the new situation of their life as students. Few examples from the larger dataset have been highlighted to show how the distinction between network as *people (C1), situations or context (C2), infrastructure (C3)* and as an *actant itself* (C4) can be used as units of analysis to identify the kinds of networks the students participated in during the lockdown.
The analysis of the cases shows how expansions of networks set forth new requirements for participation and social configurations.
In the first case, the expansion was forced onto already existing and well-functioning communities, and it was initially comprehended as a disturbance of the existing practices within the communities, respectively. The fusion between the two communities challenged the students in the way that they had to establish new joint practices and development of new patterns of participation (Hachmann & Dohn, 2018). Self-discipline and engagement were promoted as key components for participating in the new networks and further that the social reconfigurations required negotiations of roles and expectations towards the network as a new setting for learning. The cases indicate that the students perceive the networks as a way to enhance their professional development. For some students, the social aspects were primary offsets for engagement, while for others the digital infrastructure provided means for engaging in educational content more efficiently. It is remarkable, especially in cases 2 and 3, how the choice of network infrastructure (Discord and Instagram) is chosen due to different reasons. Discord represents a way to create more fluent and efficient workflows while Instagram represents a means to create a network that provides care and support.

An important finding is that the students were not particularly fond of the tools and infrastructures provided by the university. Instead, they established these by other means (Discord, Instagram, Messenger etc.). The cases indicate that online participation led to expansions of the students' repertoire regarding engagement in different kinds of network settings. Empowering them to deploy new ways of being networked that are initiated by themselves supplementing already established institutionalized infrastructures.
These choices were based on personal preferences instead of the University's it-strategy. The cases presented in this paper suggest that empowerment to make student-initiated choices regarding the selection of resources, platforms, and other tools and to create own networks lead to strong ties amongst the students. Furthermore, the students express that this highly motivated them to engage professionally in discussions and group work. As seen in the third case this leads the student to suggest that the university could utilize a more ad hoc and asymmetric approach to establishing networks. In other words, suggesting that the university could learn from the student approach to networked learning described in the cases. However, this notion may contest the nature of an ahierarichal network since they emerge when a need for exchange presents itself and that a C4 network rarely can be anticipated or formalized.

Future perspectives

We would like to end this paper by asking two questions on different levels. One regarding the empirical data and one of a more conceptual nature within the field of Networked Learning.

- Is the way of establishing and maintaining networks close to the professional identities of the participants?
- Can the four categories of networks used in this paper contribute to a consistent analysis of learning networks?

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Networked learning in a postdigital-biodigital age

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Abstract

Networked Learning has developed predominantly in university / research settings and communities, yet much of the research across decades can be shown to have implicit links with current popular and much broader global concepts, such as bioinformation, biodigitalism, postdigitalism, and viral modernity. In this paper we explore these implicit connections as an important and perhaps less unrecognized part of Networked Learning. We therefore seek to surface some postdigital-biodigital challenges in Networked Learning by revisiting relevant histories, concepts, and definitions and also noticing where there are parallels and connections, particularly when Networked Learning and Postdigital Science and Education have developed in the same *Zeitgeist*. Despite radically different histories, these areas of research seem to have resulted in different, yet often overlapping theories, research approaches, and ethos. After taking time to look into a number of these cross-cutting areas of interest, we ask the question of why a focus towards postdigital-biodigital challenges in Networked Learning is worthwhile, and indeed, why now? Based on our explorations we perceive Networked Learning to implicitly hold a long history of deep and successful engagement with postdigital-biodigital challenges in theory and through the concept of convergence. The role of convergence is an important and sustained concept in Networked Learning that can help in breaking down perceived barriers to developing cross-cutting research in any of the areas discussed throughout this paper. It is therefore timely to bring to light explicitly such connections, to help us to focus our research efforts on Networked Learning in a postdigital-biodigital age.

Keywords

Networked learning, postdigital, bioinformation, biodigital, convergence, biology, information, society

Introduction

In 2021 the Networked Learning community undertook an important exercise of self-reflection. Early in the year, a group of about a dozen core members of the community wrote the article titled ‘Networked Learning: Inviting Redefinition’ (Networked Learning Editorial Collective, 2021) and launched an open call for responses. 40 contributors from 6 continents working across many fields of education responded to the call, resulting in the article titled ‘Networked Learning in 2021: A Community Definition’ (Networked Learning Editorial Collective et al., 2021). This pair of articles revisited, updated, and brought together various understandings of Networked Learning dating from the decades-old landmark definition (Goodyear et al., 2004) to the latest debates in the field (Öztok, 2021).

These articles have attracted considerable attention and have achieved their goal to “stimulate democratic discussion about NL and to prompt some much-needed community-building” (Networked Learning Editorial Collective et al. 2021, p. 327). However, any attempt at defining a wide field or intellectual tradition such as Networked Learning is associated with some challenges. Listing the article at the third place of their Top 10 Journal Articles from 2021, Dublin City University’s National Institute for Digital Learning (2022) emphasizes that the articles show “how difficult it is to define the undefinable and how our search for common definitions and to pin down our language can inadvertently narrow thinking and foreclose on different perspectives”. We hope that ‘Networked Learning in 2021: A Community Definition’ (Networked Learning Editorial Collective et al., 2021) has managed to avoid the trap of such narrowing, yet we do not want to ponder that further. Instead, our attention is firmly on opportunities arising from the definition – instead of looking at concepts and ideas well elaborated in the definition, we decided to focus on those that could benefit from further elaboration.

Deeply invested into our current work in the area of bioinformation (Peters, Jandrić, and Hayes, 2022; Jandrić and Ford, 2022), we decided to focus on postdigital-biodigital challenges for Networked Learning. These include implications from new systems biology and digital technologies and a broad "technoscientific convergence that is taking place with biodigital technologies in the postdigital condition" (Peters, Jandrić, and Hayes, 2021b, p. 1). Looking at the definition article, we found that the Networked Learning community takes these questions seriously and offers to

> undertake critical work in promoting connections through ecological learning designs that reflect this new context. … Such contributions would extend the links that NL has established with critical pedagogy and ecologies of learning (Bozkurt, this paper) and 'bring the importance of learning to connect to the fore [i]n order to develop more cohesive and sustainable societies' (Carvalho, this paper). (Networked Learning Editorial Collective et al., 2021, p. 357)

The community further realizes that new biodigital challenges importantly "intersect with NL's focus to social justice and equality" and concludes that "[i]t is therefore time to better theorise the connections between developments in technology, inequality, and education, while also striving to actively design technologies that facilitate more equitable futures for all" (355).

The Networked Learning community has a long history of engagement with biodigitalism. Therefore, it is hardly a surprise that the community definition sees biodigitalism as an intrinsic and important part of Networked Learning. Yet as we will elaborate further in this article, it is also fair to say that a lot of biodigital work in Networked Learning is implicit, rather than explicit. Based on these starting points, this article surfaces some postdigital-biodigital challenges in Networked Learning.

Histories, Concepts, and Definitions

"Networked learning crystallized in the late 1990s by distinguishing itself from developments in digital education that were undermining human connectivity—developments that threatened to reduce education to the production, delivery and consumption of 'content' ('online materials')." (Networked Learning Editorial Collective 2021, p. 315) In one of the first available definitions, David McConnel (1998) wrote: "[n]etworked collaborative learning (NCL) is therefore the bringing together of learners via personal computers linked to the Internet, with a focus on them working as a 'learning community', sharing resources, knowledge, experience and responsibility through reciprocal collaborative learning."

In the same year, Nicholas Negroponte (1998) wrote his famous Wired article 'Beyond Digital' and claimed that "the digital revolution is over. … Its literal form, the technology, is already beginning to be taken for granted, and its connotation will become tomorrow's commercial and cultural compost for new ideas. Like air and drinking water, being digital will be noticed only by its absence, not its presence." Negroponte's article served as a point of departure for Kim Cascone (2000) and Robert Pepperell and Michael Punt (2000) who, independently of each other, published first definitions of the concept of the postdigital in the context of arts. (For a detailed account of this history, see Cascone and Jandrić, 2021.)

Since these early days, Networked Learning has developed predominantly, though not entirely, in university / research settings. Occasionally broader professional networks beyond academia are referenced, but this is a relatively recent development. Since 1998 the biannual Networked Learning Conference serves as a meeting point for researchers in the field, and conference proceedings have published some major related works. 2014 marks publication of the first book in then-new Research in Networked Learning book series, which, publishing approximately one volume per year, has become a major source for Networked Learning research. The postdigital perspective has a very different path of development. It had begun in a wide range of settings such as art exhibitions, popular music, architecture, design, and so on, with an occasional – but far from systematic – academic appearance. Founded in 2018, *Postdigital Science and Education* journal and book series have begun a community effort of synthesizing, systematization, and development of postdigital work as a theory and research approach. This is increasingly recognised across different sectors in the community too (Hayes et al., 2021) and expanded via authors from industry, business, councils and charities, as well as from academia (Hayes et al., 2022).

Networked Learning and Postdigital Science and Education have developed in the same *Zeitgeist*. Consequently, their radically different histories have resulted in different yet often overlapping theories, research approaches, and

ethos. For instance, the Networked Learning community has always been strongly focused on defining the field, culminating in two definitional articles that inspired this paper (Networked Learning Editorial Collective, 2021; Networked Learning Editorial Collective et al., 2021). In opposition, Jandrić and Ford (2020) argue that "one day, probably, our postdigital condition will be condensed in concise encyclopaedia entries and routinely explained by undergraduates. One task is to ensure this does not happen, and that the postdigital remains—for as a long as it is productive—a concept that constantly resists any final definition."

Indeed, as Sian Bayne cautions in her contribution to 'Networked Learning in 2021: A Community Definition', "[t]o define a field is necessarily to put boundaries around it, to determine which writings, conversations, people are 'inside' and which are 'outside' … [t]his is inevitable, and not a reason for choosing not to define" (Networked Learning Editorial Collective et al., 2021, p. 333). As we already mentioned in the Introduction, there are good reasons for and against definitions, and these reasons are well beyond the scope of this paper. For our purpose it is sufficient to say that the recent definitional articles of Networked Learning have inspired writing this article, thus contributing to further development of the field.

This article's topic, bioinformation, has a much longer history than Networked Learning or Postdigital Science and Education. While this history could also easily be a research topic in its own right, we use it to quickly contextualize our research in the field.

For the most part of human history, physics and biology have followed separate development trajectories. In the eighteenth century, for instance, Isaac Newton focused on "a mechanical approach [that] analysed the physical universe as a great machine" and "the dynamical approach [that] concentrated on the mathematical relationship between quantities that could be measured" (Science Encyclopedia 2022). At the same time, Carl Linnaeus developed his taxonomy of living species. In the early twentieth century, physics developed insights into laws governing matter, motion, and energy, resulting in many applications including the development of the computer. At the same time, biology had progressed from its nineteenth-century focus on cells towards molecular biology; a field of study enabled by various tools developed by physics such as X-ray diffraction and electron microscopy. Following the development of computers, sometime in late twentieth century, biology research had become mutually constitutive with information technology.

This brings about the so-called Great Convergence between biology and information, which has three important consequences. First, the Great Convergence "has not arrived from a sudden or artificial blend of the 'soft' or 'moist' *bios* and the 'hard' or 'cold' *techne*; instead, *techne* is an inherent feature of *bios*. To various extents, biology is digital information and digital information is biology; one cannot be divorced from the other." Second, "[t]he ability to turn biology into digital code, and then to return digital code back into biology" enables "tinkering with and actively transforming living organisms" (Peters, Jandrić, and Hayes, 2021; see also Peters, Jandrić, and Hayes, 2022). Finally, these developments open up many social and ethical issues. For instance, bioinformational achievements such as vaccines are mutually constitutive with sociology and psychology of vaccinations (McKenzie et al., 2021); governments and international institutions keep a strong legislative grasp on the development of gene editing technologies to avoid negative consequences (Peters, Jandrić, and Hayes, 2022).

Biology, information, and society have always been interconnected. A simple, pre-digital example is a human being (biology) reading a book about democracy (information) and applying it at a ballot (society). Yet the Covid-19 pandemic, and its numerous challenges, from tracing infecting persons through Covid-passports to anti-vaccination movements, have complicated and intensified these relationships in our widely digitised society. For each of us as individuals, these are changes that affect our positionality in postdigital society (Hayes, 2021). Some people have greater digital access than others to take advantage of related health or education benefits that emerge, whilst others may be positioned at a disadvantage when data is gathered on them. How individuals are placed in healthcare systems is rapidly changing, due to disruptive technologies, Internet of Things (IoT), artificial intelligence and biodigital convergence.
Narang (2021, p. 85) discusses examples of IoT in healthcare, such as 'hearables', which are new hearing aids that transform how those with hearing loss interact with the world, as they are compatible with Bluetooth and therefore can sync with a smartphone. This allows a wearer to filter, equalize, and add layered features to real-world sounds. Such valuable benefits are not though necessarily available to those who are without the income to run a smart phone, pay for related data, or the ability or opportunity to learn the skills required, to interact with hearables. Then there are 'ingestible sensors' which are pill-sized and, when swallowed, monitor the medication in our body and warn us if they detect any irregularities. For a diabetic patient this can curb symptoms and provide an early warning. Or in the case of 'moodables', which are head-mounted wearables that send low-intensity current to the

brain which elevates our mood (Narang, 2021: 85) there are clearly exciting possibilities, as well as challenges. Issues of data security and privacy for individuals need to be balanced against the benefits of many organisations accessing healthcare analytics and tracking reports on patients. Although connectivity protocols are enabling new ways to spot and treat illnesses, integration of multiple devices across protocols requires a consensus across stakeholders. The human dimensions converge further with informational and societal concerns, as data-overload can also hamper the decision-making by health professionals (Narang, 2021: 84).

These few examples, among many, demonstrate wide-reaching implications for the field of Networked Learning. Where once the focus on the 'network' may have largely involved the devices, new ubiquitous computing technologies, wireless mobility and computer mediated communications, this often concerned the 'learning' of humans as they travelled and used various networks. With greater postdigital-biodigital convergence, there has been a considerable shift that requires a focus too now on how new technologies and their related data travel through people, and indeed how they in turn use humans.

In the third decade of the twenty-first century, various aspects of human lives, including teaching and learning, are situated at the intersections between biology, information, and society (Jandrić, 2021). Current research in the field is scattered across publications and its language is fairly inconsistent. Based on our previous research in the field, we now provisionally define the main terms used in the rest of the article.

Bioinformation refers to a scientific convergence between "biology as digital information, and digital information as biology, are dialectically interconnected" (Peters, Jandrić, and Hayes, 2021a).

Biodigitalism is a wider perspective, that is "[t]heoretical and practical (praxis); scientific and technical (technoscience); analogue and digital (postdigital); biological and informational (bioinformational); and political and economic (bioinformational capitalism)" (Peters, Jandrić, and Hayes, 2021a).

Postdigital "is a wide-open position or perhaps even a worldview which encompasses various reconfigurations between technologies and humans. This applies to all kinds of technologies, including but not limited to biodigital technologies. … [t]he biodigital is an important aspect of the postdigital idea, but it is far from the only one." (Peters, Jandrić, and Hayes, 2021b)

"Viral modernity is a concept based upon the nature of viruses, the ancient and critical role they play in evolution and culture, and the basic application to understanding the role of information and forms of bioinformation in the social world. The concept draws a close association between viral biology on the one hand, and information science on the other – it is an illustration and prime example of bioinformationalism that brings together two of the most powerful forces that now drive cultural evolution." (Peters, Jandrić, and McLaren, 2020)

Taken directly from our recent works, these definitions are only indicative; rather than providing in-depth analyses, they merely serve to establish what we mean by defined concepts and build background for our research in this paper.

Postdigital-biodigital challenges in networked learning

Since its inception, the Networked Learning community has importantly cherished the values of openness and free access. The conference proceedings of all Networked Learning conferences and books in the Research in Networked Learning book series are available online, so this large body of research is easy to access and explore. Our first attempt at looking at postdigital-biodigital challenges therefore consisted of a simple search using relevant keywords such as bioinformation, biodigital(ism), biology, postdigital, and so on. This search has yielded very limited results, implying that a lot of postdigital-biodigital work in networked learning is implicit, rather than explicit. Since our 'brute-force' attempt at identifying postdigital-biodigital approaches in Networked Learning failed, we returned to definitions and theories.

Postdigital-biodigital can be found already in the first definition of networked learning:

> We define 'networked learning' as learning in which [information and communications technologies are] used to promote *connections*: between one learner and other learners, between learners and tutors; between a learning community and its learning resources. Some of the richest examples of

> networked learning involve interaction with on-line materials *and* with other people. (Goodyear et al., 2004, pp. 1-2)

Speaking of connections between a community and its resources, of interactions between digital materials and people, this definition exhibits a clear focus to postdigitalism-biodigitalism. Two decades later, Dohn et al. (2018) and De Laat and Dohn (2019) identified four understandings of Networked Learning, one of which is "an emphasis on connections between (human and non-human) actants – understanding learning situations as entanglements of people and things" (Networked Learning Editorial Collective, 2021, p. 316). Similar ideas can be found across a range of definitions and theories of Networked Learning, yet implicit reference to postdigitalism-biodigitalism reaches way beyond definitions. In what follows, we expand our search for postdigitalism-biodigitalism in Networked Learning research more generally.

A lot of Networked Learning research, especially that arriving from Edinburgh University's research group led by Siân Bayne, takes a critical posthumanist approach (see Jandrić, 2017, Chap. 9).

> Posthumanist philosophy constitutes the human as: (a) physically, chemically, and biologically enmeshed and dependent on the environment; (b) moved to action through interactions that generate affects, habits, and reason; and (c) possessing no attribute that is uniquely human but is instead made up of a larger evolving ecosystem. There is little consensus in posthumanist scholarship about the degree to which a conscious human subject can actively create change, but the human does participate in change. (Keeling and Nguyen Lehman, 2018)

Indeed, (human and non-human) agency is a prominent question that situates Networked Learning research in the broad area of sociomaterialism. However, Networked Learning is not a passive recipient of these theories; over the years, Networked Learning research has significantly contributed to theory and practice of sociomaterialism and critical posthumanism beyond its immediate focus to learning.

One such example arrives from the works of Chris Jones, who argues that Networked Learning

> outlook remains broadly sociomaterialist in that it continues to conceptualise knowledge and capacities as being emergent from the webs of interconnections between heterogeneous entities, both human and non-human. However, it differs from the strong readings found in ANT and post-humanism in that the author argues that all actors cannot be treated as completely symmetrical for research purposes because of the particular access that we have to accounts of experience from human actors. (Jones, 2018, p. 51)

Indeed, Actor Network Theory (ANT) is often used in networked learning research; in turn, insights developed in the context of Networked Learning have significantly influenced ANT in works published beyond the Networked Learning community (e.g., Royle, 2021).

Another significant area of Networked Learning research inseparable from the postdigital-biodigital challenge are learning spaces[3]. The acknowledgement of 'in between' spaces and their importance in changing patterns of learning both online and offline, but also in classrooms, buildings, campuses and the city are viewed by some in terms of a 'networked learning landscape' (Nordquist and Laing, 2015). Multiple interconnected aspects of life align with changing curricula. We would add to this some considerations of converging disciplines across curricula too, as these alter in postdigital-biodigital society. It becomes important, as we discuss changing learning spaces, to also consider the role of places, and indeed time. Networked Learning takes a holistic approach in seeking to understand what occurs for individuals who are learning across complex and dynamic contexts. Time in these spaces can no longer be considered in only linear, commodified patterns, which in turn requires new forms of writing educational policies that do not separate technology from human labour, in all of its intimate spaces and forms (Hayes, 2015).

[3] Latest research in the field can be found in *Postdigital Science and Education*, *4*(1), which is a Special Issue on 'The Postdigital Learning Spaces of Higher Education', edited by prominent members of the Networked Learning community, James Lamb, Lucila Carvalho, Michael Gallagher, and Jeremy Knox. https://link.springer.com/journal/42438/volumes-and-issues/4-1. Accessed 28 January 2022.

Language and terminology, underpinned by global, neoliberalist values, has also been an ongoing concern for Networked Learning scholars. What is assumed and written in policies for technology, as applied in educational contexts, has human and material consequences that are realised in workloads and health issues if the time and labour involved is not acknowledged. Uncovering such forms of deception through linguistic analysis is one way to explicitly "restore our human visibility" (Hayes, 2016). This becomes important amid the realisation that many of our global concerns about sustainable means of production in industry are echoed in practices within increasingly marketized education. Yet change could be on the horizon as the neoliberal economic model becomes challenged by 'advanced biodigital developments and principles of bioeconomy'. These require education based on environmental self-renewal, rather than consumer consumption' (Peters, Jandrić, and Hayes, 2021b). Additionally, any shift in economic ethos and practices requires too sustainable education and indeed policy that discusses the diverse positionality of humans honestly in postdigital-biodigital society (Hayes, 2021).

Why focus to postdigital-biodigital challenges in networked learning? And why now?

Networked Learning is a philosophy, a research approach, a rich set of diverse practices, an "educational paradigm" (Jones, 2015), and much more. However incomplete, our overview of Networked Learning research suggests a long history of deep and successful engagement with postdigital-biodigital challenges in theory (critical posthumanism, sociomaterialism, learning spaces, linguistics, etc.), practice (ANT etc.), and definitions old (e.g., Goodyear et al., 2004) and new (Networked Learning Editorial Collective, 2021; Networked Learning Editorial Collective et al., 2021). Explicit references to the postdigital-biodigital challenges in theory and practice of Networked Learning are scarce, yet implicit references are almost omnipresent. We would go as far as to say that postdigital-biodigital challenges lie at the very heart of Networked Learning, and that the Networked Learning community has made a considerable global contribution to researching these challenges. So why 'discover the wheel' and focus to things that are already here? And why do that now?

Scholarly research is always closely related to its *Zeitgeist* – and these days, our *Zeitgeist* changes in a blink of an eye. Looking for example(s), the archive of books of proceedings following 13 Networked Learning Conferences[4] does not merely present the development of Networked Learning research; it also displays different interests, and different foci, of the community in different historical periods. In 1998 the community was focused to lifelong learning; in 2002 there was a lot of talk about communities of practice; 2010 surfaced a plethora of issues related to globalisation, interculturality, and international development; 2016 was felt as the right time for reflection and 'looking back – moving forward'. Since 2020, obviously, the (narrowly defined) topic of the day are various questions arising from the Covid-19 pandemic, and looking more generally, the postdigital-biodigital challenge. As the community, and indeed the whole world, struggles to make sense of our pandemic moment, it is important to emphasize that this research does not start from scratch and there is a lot of excellent earl(ier) Networked Learning research that can help and support our efforts.

Convergence

One such early example is the notion that Networked Learning itself "can be considered the outcome of convergence" (Jones and Steeples, 2002, p. 3). Perhaps this was somewhat prophetic in nature when, 20 years later, we can notice and discuss "the technoscientific convergence that is taking place with biodigital technologies in the postdigital condition" (Peters, Jandrić, and Hayes, 2021b, p. 1). Today's research arrives under various names and labels such as bioinformationalism, biodigitalism, postdigitalism, viral modernity, and others. These new (and newly popularized) terms are not mere linguistic exercises, as they point towards previously unseen or much less relevant phenomena. Let us quickly examine what is brought by concepts defined at the beginning of the chapter to notice longstanding connections with earlier discussions of convergences of telecommunications, digital computer and information technologies, distance and place-based learning and resulting hybrid forms (Mason and Kaye, 1990).

The concept of bioinformation has a long historical tail: more recently, it has already been researched well beyond Foucault in fields such as mobility studies (Traxler et al. 2021). Yet the introduction of Covid-passports with citizens' biodata has opened up a plethora of questions at the intersections between bioinformation, privacy, freedom, and human rights (Zuboff, 2019). While we could research these developments without using the word bioinformation, the concept does focus our attention to these new developments and concerns.

[4] See https://www.networkedlearning.aau.dk/past-conference-proceedings/. Accessed 24 January 2022.

Biodigitalism expands this focus in various directions, most notably to recent transformations sometimes called bioinformational capitalism (Peters, 2012). Indeed, social science research into Covid-passports must acknowledge the fact that copyrights and production lines for most currently available vaccines belong to the corporate sector. While this does not imply, by any means, validity in this or that Big Pharma conspiration theory, critical research must, among other leads, also follow the money and criticize the social system (Peters, 2020).

Postdigitalism speaks of general relationships between humans and technologies and is well-suited for the bioinformational / biodigital mesh-up between the digital and the analog. Asking important questions such as those pertaining to human nature (Savin-Baden, 2021), postdigitalism links questions of our day to eternal (human) concerns.

The concept of viral modernity is of a different order of magnitude. Viral modernity can hardly say anything about ontology or epistemology, as it predominantly focuses to concordances between the 'behavior' of information and viruses. Yet the question of post-truth and fake news, which is bioinformational, biodigital, and also postdigital, is a burning issue of today – and the concept of viral modernity, amongst others, can help us shed a fresh light on it (Peters, Jandrić, and McLaren, 2020; Peters and Besley, 2021).

Conclusion

This paper shows that Networked Learning has always had a strong yet implicit focus to postdigital-biodigital challenges. With the advent of the Covid-19 pandemic, however, these challenges have been brought to the fore and have developed in various practical directions such as Covid-passports. Networked Learning has a lot to offer to current research in the field; listing its main contributions, and linking them explicitly with challenges of our day, that may be of practical help to researchers. The role of convergence is an important and sustained concept that can help in breaking down perceived barriers to developing cross-cutting research in any of the areas discussed in this paper: "The use of networked information technologies has blurred the boundaries between the methods used in both forms of education and the clienteles they address" (Jones and Steeples, 2002, p. 3).

Today's popular concepts connected to convergence, such as bioinformation, biodigitalism, postdigitalism, and viral modernity – many of which have arrived well after Networked Learning – are at the same time closely linked to, and distinct from, Networked Learning. As de Laat and Dohn wrote (2019: 19) in a recent article, "the question *Is networked learning postdigital education?* is far from rhetorical, and the answer certainly is not no. Neither is it, however, a clear yes" (emphasis from the original). Definitional questions remain well beyond the scope of this article, yet our research indicates that these concepts do help us focus our research efforts and should be embraced in the theory and practice of Networked Learning research.

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Envisioning scenarios in designs for Networked Learning: Unfolding value tensions between technology and social learning

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Abstract

This article presents an application of a design methodology to envision implicit value hierarchies in the design process of a digital learning platform meant to encompass learning processes and activities conducive to experiential collaborative learning (ECL). The authors argue that many technologies for the field of education fall short of their purposes and neglect intended underpinning pedagogy and didactics. Previous research efforts in networked learning have primarily focused on conceptual critiques of the implementation of EdTech and warned of technological euphoria undermining relevant caution. This means, that when a design team tries to conceptualize technological artefacts into a script the more ethical and value-oriented parts of the learning process tend to be ignored. While we agree with the conceptual critiques, our approach has instead been to engage with the design process and implement appropriate methodologies in an attempt to highlight implicit value hierarchies in the underlying learning theory. When using technologies in Networked learning we thus emphasize that both designers and stakeholders should engage in a systematic discussion and reflection of values and related judgements while constructing a value hierarchy.

Through a Value-based design methodology based on semantic zooming we thus present 7 interconnected envisioning scenarios developed in the UnFoLD project to demonstrate how it is possible to operationalize values into detailed design briefs or technological scripts. This article will through presented experiences from a design process, show how the methodology of envisioning scenarios can be applied to mitigate the risks of implementation technology in a learning situation. We argue that an awareness and mapping of values as a part of the design process is essential and that an increased focus on the ethical and moral responsibilities of designers and involved researchers are important as technologies should not be seen as isolated, value-neutral, or uncomplicated translations of analogue teaching activities. The purpose of the article is to inspire other researchers and designers to implement value hierarchies, envisioning scenarios, or other similar methods to ensure that pedagogical and didactic priorities are not lost in accommodating marketability, practicalities, or technological constraints.

Keywords

Values in design, Values hierarchy, Envisioning, Technology design, Design methodologies

Introduction

Networked Learning is an area of research that has historically been centrally concerned with values in relation to designing for and practicing teaching and learning (de Laat & Ryberg, 2018). This concern extends back to e.g. the early manifesto on Networked Learning (Beaty et al., 2002) where the centrality of educational values was emphasised, but equally encompassing wider societal or political values such as supporting democratic processes, diversity and inclusion. The role of values has over time been highlighted in different articles or chapters (Hodgson et al., 2012; Hodgson & McConnell, 2019; Jones et al., 2017) and most recently explored in the article 'Networked Learning: Inviting Redefinition 'which was a collectively produced article following and extending discussion at a round table held as part of the Networked Learning Conference 2020 and leading to a suggestion for an updated description of Networked Learning:

> "Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies. Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources and solutions, across time, space and media". (Networked Learning Editorial Collective (NLEC), 2021).

Further, the collective article highlights three central and intertwined phenomena of particular interest within Networked Learning: Human/inter-personal relationships, Technology (especially digital communications technologies), collaborative engagement in valued activity (joint inquiry, knowledgeable action, etc). The focus on human relationships entails questions about e.g., trust, power, difference, solidarity. Technology concerns how digital technologies shape and are shaped by human activity and how "artefacts and infrastructure are assembled or reconfigured in complex ways" provoking questions about the socio-material, affordances, access, appropriation, ownership, etc. (Networked Learning Editorial Collective (NLEC), 2021, p. 314). Finally, collaborative engagement relates to questions about knowledge, values, shared projects, and engagement with social change.

The first and third point are dimensions that have, in our view, been much discussed in networked learning literature, and particularly discussions of values underpinning designs for learning or how to incorporate values and social change as part of networked learning processes have been approached theoretically, methodologically, and empirically. We would argue that values in relation to designs for learning are relatively well-explored, but when shifting the focus from pedagogical design towards designing and developing technologies for networked learning our knowledge and practice within networked learning are less developed. While there are great conceptual critiques and analyses of how technologies shape or are shaped by human activity, there is less engagement with the actual design and development of educational technology. This, as noted by de Laat & Ryberg (2018), is not surprising as the networked learning community leans more towards the pedagogical and conceptual side, more than development and design. However, as pointed out in Dohn et al. (2021) it does raise questions of how we can start to engage with for example AI, algorithms and learning analytics beyond the conceptual critiques and analyses.

The article is based on the research and development project 'Unified platform for the Future of Learning and Development '(UnFoLD), which aims to investigate and develop a new learning platform where 'Experiential Collaborative Learning '(ECL) forms the pedagogical foundation (Jensen et al., 2021; *UnFoLD*, n.d.). We will present experiences from a design process which is a part of the development of an online platform for experiential collaborative learning, in which the methodology of envisioning scenarios has been applied to mitigate the risks of implementation. Based on the above introduction, a general discussion of why an awareness of values in Networked Learning is important, is presented. Next, the use of technology in Networked learning is elaborated to challenges existing and embedded values in technologies. Then, the article presents a Value-based design methodology for creating envisioning scenarios specific to Networked Learning. Finally, the article is rounded off in a debating conclusion

Networked learning infrastructure

Goodyear (2021) writes about why educational infrastructure is a prerequisite for networked learning. Such an infrastructure provides a landscape of affordances with different possibilities of connections. He emphasises two perspectives, as (1) a set of objects to be designed, planned and managed and 2) as entangled and experienced in actual activities (Goodyear et al., 2021). An aspect of Networked learning is thus an educational infrastructure that aims to connect people and digital mediated interaction through a theoretical position of learning that emphasises

social, relational, and cultural aspects of learning, be they Actor-network theory (ANT), activity theory, communities of practice, socio-material, social constructionist, or constructivist perspectives (de Laat & Ryberg, 2018; Dohn et al., 2018). With this understanding of learning, networked learning builds on the idea that knowledge is constructed by the learners rather than transmitted to the learner. Connectivity and dialogue are therefore central pedagogical and philosophical principles of Networked learning (de Laat & Ryberg, 2018; Dohn et al., 2018)

The impact of mediated learning through digital platforms have made it clear that transferring analogue content to these new digital forms is never as simple as that (Williamson, 2019; Selwyn, 2011). The difficulties encountered only increase in complexity and become more pronounced when the learning approach is strictly contingent on connectivity, collaboration, and active participation. Many aspects such as how to translate content, work forms and practices, as well as considerations of how appropriate these actually are when the learner is experiencing them through the mediation from digital platform are in play. One aspect which often seeps through the cracks within the designprocess are the embedded values of technologies. The claim of value-neutral technologies has been thoroughly refuted and conceptualizing them as mere mediums of transfer only serve to blind us to the myriad of unexpected and unintended consequences of their use (Selwyn, 2011). There are many interests at play in the decision of whether or not to implement new EdTech, and besides the technological euphoria that threaten to soften essential critical concerns, the role of experts and networks seeking to profit from the implementations is growing (Selwyn, 2016). The realization that EdTech has become a political force which influences the future of education should not necessarily make educators afraid of their implementation, but rather entice them to engage in the much-needed critical reflection and design work required to align the technologies with the foundational values of their approach to learning (Williamson, 2019).

But we also need to develop a more critical appreciation of the contemporary political force of edtech, and the power networks behind it, on education at global and local scales. And that means getting up-close to the edtech experts who are building the apps, devices, platforms and infrastructures to understand how the technology gets produced, and up-close to the policy networks that are seeking to influence the future of education through those technologies and media (Williamson, 2019).

Unfortunately, while it is broadly acknowledged that specific technologies shape the practices and possibilities of engaged learners, critical reflections of the pedagogical and ethical implications of implementing learning technologies/edtech are few and far between (Williamson, 2019; Zawacki-Richter et al., 2019). As such this article argues that the implementation of further and maybe ever more encompassing technologies such as AI or machine learning in an education setting that build on Networked learning calls for a heightened focus on ways of envisioning and critically reflecting on the possible outcomes of implementation in the design process.

Why talk about values in networked learning

The philosophy behind "values in design" or "value-sensitive designs" (Nathan et al., 2008), stems from the fundamental assumption that interaction with products, digital systems or technologies have an impact or affect people's behaviours and experiences. Responsible designers, therefore, must attempt to anticipate how users will interact with the products, digital systems, or technologies they are designing. It emphasises that design is not just about incorporating primary or secondary functionality, but it includes ethical considerations about what kind of behaviours and experiences are desirable and ethical to promote (Ross et al., 2012; Verbeek, 2006). Developing and using interactive technologies in learning design thus includes considering that ethical responsibility (Nathan et al., 2008).

If technologies are not value-neutral (Verbeek, 2006), what significance do these hidden values then mean when Networked learning is facilitated through technologies such as an AI system or machine learning? And how do we ensure that the theoretical and basic principles of learning are not ignored by a technology euphoria? Selwyn (Selwyn, 2016) in particular has been a critical voice in warning against technology fascination taking over the essential vision of a project. He writes, among other things; "our primary focus should not be on technological devises, tools and applications per se, but on the practices and activities that surround them, the meanings that people attach to them and the social relations and structures that these technologies are linked to" (Selwyn, 2016, p. 2). Frauenberger, Rauhala, and Fitzpatrick (2017) also talk about what impact technologies have on individuals or society/communities, and consequently what responsibilities their designers have. They emphasise the need for a new ethical discourse in the field. An underlying problem in the development of technologies like learning analytics, AI- and machine learning is, according to Selwyn (2016), a one-sided focus on design requirements that

specify the criteria for what is technically feasible, thus limiting the freedom of designed learning processes, not allowing for a sufficient inclusion of the social and cultural factors. It is especially the specific values the stakeholders bring to the table when designing technology that calls for a reflective practice that explicitly draws attention to a transparent process (Bos-de Vos, 2020; Frauenberger et al., 2017). Faurholt & Kofod-Jensen (2010) warn against the risk that programmers will set the agenda for how to understand the pedagogical processes of learning which do not necessarily correspond to a pedagogical set of values (Popenici & Kerr, 2017; Williamson, 2019). By explicitly recognizing the variety of ways in which a technology stimulates values it might be possible to avoid digital learning design based on different embedded technologies that cannot translate the complexity of the learning process into digital value-based and coherent ecosystems (Nathan et al., 2008).

The meaning of discussing values in designs

The research field of "Values in design" uses the interactional definition of values resulting from the interaction of users and other stakeholders with technology (Bos-de Vos, 2020). Value can thus occur in a variety of ways and can be understood as *"lasting convictions or matters that people feel should be strived for in general and not just for themselves to be able to lead a good life or realize a good society."* (Poel & Royakkers, 2011). If we want to understand the world today, we need to understand how patterns and shared symbols create cultural metaphors expressing different values (Lent, 2017). Therefore, there is a need to distinguish between value changes that primarily occur due to social developments and value changes that are induced by technology (Bos-de Vos, 2020; Verbeek, 2006). In all technology there are integrated value hierarchies that amplify specific aspects of reality while reducing others (Verbeek, 2006). The inlaid values are not fixed properties of designs; however, they shape a relationship between humans and technologies (Tromp et al., 2011; Verbeek, 2006). In this article we apply the term value hierarchy to discuss how overarching values can be operationalized into design requirements. If designers and stakeholders don't engage in systematic discussion and reflection of values and related judgements while constructing a value hierarchy, existing and pragmatic values become dominant (Bos-de Vos, 2020; Williamson, 2019). And because of that, literature highlights that numerous attempts at technological designs fail because designers do not understand what factors lead to changes in behaviour (Fogg, 2009; Frauenberger et al., 2017; Hansen, 2016, 2018; Kight & Gram-Hansen, 2019).

Technology in networked learning

The downside of technology

Based on literature (Andersen et al., 2020; Caviglia et al., 2018; Kilińska & Ryberg, 2019; Laursen, 2020; Tahiru, 2021; Wistoft et al., 2020) it is evident that particularly collaborative and exploratory functions in Networked learning systems are poorly utilized as they are not built on basic pedagogical values and visions. Especially the collaborative and social processes, like those incorporated in experiential and collaborative learning (ECL), can be complicated to digitize since engaging in learning activities do not necessarily establish social learning communities. According to Nathan, Friedman, Klasnja, Kane, and Miller (Nathan et al., 2008) a majority of the design scenarios and methodology share two key characteristics: 1) describing the functionality of technology under development, and 2) the immediate use of the technology by its intended user-groups (Nathan et al., 2008). Although the systems enable semantic functions and compounds, that connect users' social needs and data as well as enable sharing of knowledge both synchronously and asynchronously, this is predominantly associated with basic information and communication (Caviglia et al., 2018). The result is often digital systems that foster a low connectivity between the students as well as low motivation as they constantly face a barrage of high-tech triggers – beeps, email alerts, bouncing icons etc. (Fogg, 2009). Likewise, Faurholt & Kofod-Jensen (2010) have previously emphasized that the systems primarily cater to teacher-driven and instructional teaching methods rather than more student-centred collaborative processes, where the learners are given the opportunity to collaborate in a social network and produce new knowledge. Finally, Kilinska and Ryberg (2019) have described how the learning platforms 'limited functions force the students to supplement their social learning activities with other resources or platforms (Kilińska & Ryberg, 2019).

To effectively encode experiences that change behaviours, there is a need for a much more practical understanding gained from value-based design activities. Without this understanding, designers are mostly guessing at solutions or maybe even imitating techniques that work without understanding why that is the case, which can lead to submerged and sustained value conflicts between system and users (Bos-de Vos, 2020; Davis, 2009; Davis & Nathan, 2015; Fogg, 2009). Zawacki-Richter et al. (2019) has uncovered what challenges are related to the use of AI in educational learning systems and conclude:

> (…) a stunning result of this review is the dramatic lack of critical reflection of the pedagogical and ethical implications as well as risks of implementing AI applications in higher education (Zawacki-Richter et al., 2019).

This statement is supported by both Misiejuk & Wasson (2017) and Popernici & Kerr (Popenici & Kerr, 2017) where the latter point out that there should be ongoing awareness of education as a student-centred activity, which can't be replaced by technology-centred solutions (Popenici & Kerr, 2017).

Reevaluating our assumptions

During the past decade, the concept of "script" as something that indicates how technologies can prescribe human actions, social networks and processes of collaboration that evoke certain kinds of behaviour has been dominant (Verbeek, 2006). Latour talks about it as a way to describe the "implicit manuals" that products embody, as well as a concept to clarify the specific relations between designer, product, and user (Tromp et al., 2011). According to Lent, Jeremy (2017), the combination of AI technology with experiential collaborative learning affords a re-examining of the assumptions about (1) what we are trying to accomplish and (2) how we are going about it. (Lent, 2017). The combination of the scientific with the ethical requires a design process that understands knowledge as something that can be experienced as esoteric where not all science is aligned and that it can be divided between different scientific traditions and paradigms - knowledge is not as clear cut as we sometimes imagine it to be (Lent, 2017). This means, that when a design team tries to conceptualize technological artefacts into a script it might be too limited to cover the more ethical and value-oriented part of a learning process (Verbeek, 2006). Scripting functions and actions of students thus contain a number of ethical questions regarding how technological designs can transcend and embody the quality and values embedded in the native visions and conceptual frameworks. There is thus a need for assessing technologies with respect to the role they play in a learning context. In a way, it reveals a specific responsibility of the designer, who can be seen as the inscriber of scripts (Frauenberger et al., 2017; Verbeek, 2006). Some of the previous assumptions and mindsets of past technological paradigms is, therefore, obsolete as the design of technology used in Networked learning is both explorative, situated, and responsive. Because the ethical and value-oriented processes have remained static and anticipatory, the technologies are now subject to what could be called a 'value change'. Instead, design processes need to be able to support the emergence of new values in society (Bos-de Vos, 2020; Frauenberger et al., 2017). Differences between actors 'perspectives on values exist but unfortunately, it is often overlooked in a design process. Value is rarely explicitly discussed, or discussions are either very abstract or overly specific (Bos-de Vos, 2020). Nathan, Friedman, Klasnja, Kane, and Miller, (2008) therefore propose envisioning long-term effects of interactive and digital systems by encountering the following three intertwined challenges: (1) the complexity of socio-technical systems, (2) the uncertainty of future outcomes, and (3) the emergent quality of systemic interactions (Nathan et al., 2008). In the act of envisioning, it is thus possible for designers to acknowledge different potential outcomes when a new technology is combined with a specific cultural and societal milieu.

Envisioning as a Value-based design methodology in UnFoLD

Based on a Value-based design methodology, it is possible to create an awareness in the design process that can transform the conceptual visions into regular and detailed design briefs or technological scripts. This process involves sketching processes, including for example Envisioning Scenarios (Bos-de Vos, 2020; Frauenberger et al., 2017; Nelson & Stolterman, 2012). These scenarios are typically based on specific design requirements or design constraints that can substantially impact individuals, society, and the natural environment, now and potentially well into the future (Nathan et al., 2008). Envisioning is a design concept that aims to find out where the project is and whether it is moving in the desired direction, in accordance with the pedagogical intentions and values. The special thing about envisioning processes is that it happens through imaginative thinking that involves a clear articulation and understanding of the interaction between the learning theorist, the designer, and the programmers. The imaginative thinking can contribute to envisioning based on, for example, "beyond mainstream" lens of design noir or unintended use (Nathan et al., 2008). It is the different changes or perspectives on the scaling of a value-laden problem that illustrate new problems and opportunities to recontextualize the problem.

The shared understanding of networked learning entails a special focus in the UnFoLD project where the digital learning platform is to create a connection between both people and digitally mediated interactions. By this, networked learning, and thus the project of UnFoLD can not only be understood as random use of the chosen technology from a reductionist view in relation to organisations forms, content, learning activities, interactions e.g. UnFoLD wants to create a learning platform that contributes to a learning vision that neither consciously nor unconsciously supports instruction and training-based teaching with a low potential of learning

The design process in UnFoLD revealed that Networked learning can be visualized and discussed according to seven interconnected envisioning scenarios (see Figure 1). Each envisioning scenarios can be visualized through what Kolko (2011) calls a semantic zooming; semantic in the sense that the hierarchies are not given, but rather constructed by their perceived connections and linguistic meaning. It means that the overall digital Networked learning system in the UnFoLD project can be developed, analysed, or discussed from both an abstract level that describes values and ethical considerations in accordance with how users interact with the system, to a more concrete level consisting of what kind of activities are given to the students. Or it could be a movement from one kind of aspects or dimension to another kind. The point is, there is no right answers or way to shape these envisioning scenarios. It depend on the people participating in the discussion. Envisioning is, therefore, a methodology for how to discuss hidden values though a sketching process. Based on Selwyn (2016) and Goodyear's (2005) theoretical understanding of a learning system, the design process of the UnFoLD project result in seven different envisioning scenarios (see Figure 1).

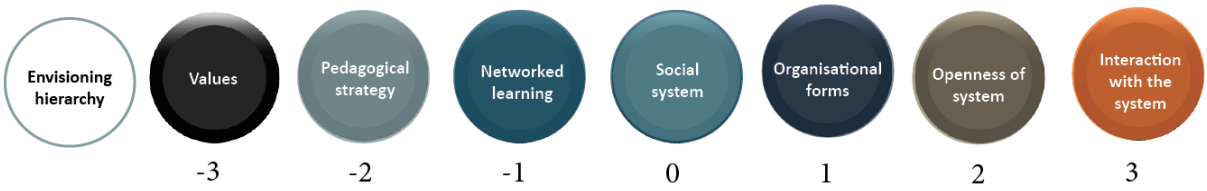
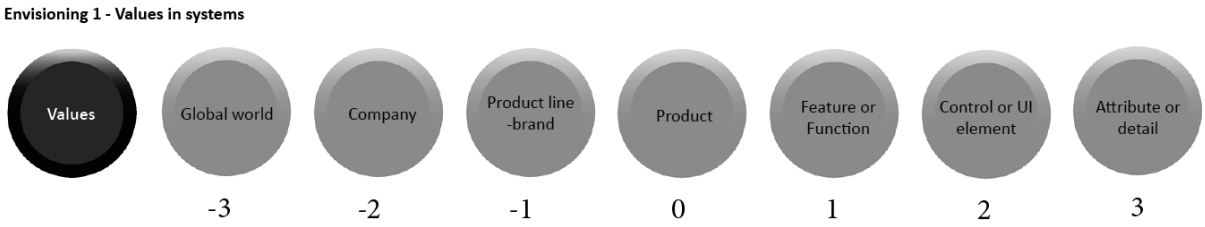


Figure 1: Envisioning hierchy

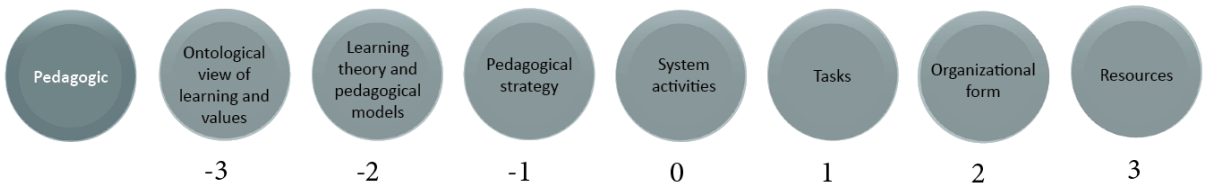
Also, the design process indicates that every single design element can either be seen as an element in a system or a system in itself, where more than one feature is interconnected and therefore part of the system's causal complications (Kolko, 2011; Nelson & Stolterman, 2012). In the following section, each envisioning scenario from the project of UnFoLD is presented separately. Here, the semantic zooming in relation to the analytical criteria that the design process has entailed for the UnFoLD project is elaborated.

Envisioning scenarios through literal and sematic zooming



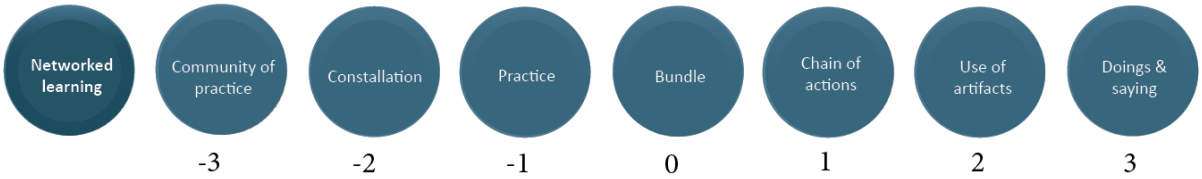
The first system focuses on values. At a global level, it is important to have an ethical and value-based view. All products or systems affect the world we live in, so even though technology provides us with local opportunities, it does not necessarily help to create positive development on a global scale. So, in UnFoLD, how do we avoid creating a system where AI contributes to a view of learning that supports instruction and training-based teaching with a low learning potential? Here, it is important to clarify the values and areas of interest of all stakeholders. Through a stakeholder analysis it is possible to ensure that designers are not blindfolded in the design process. Without this mapping, it is not possible to find the values and interests.

Envisioning 2 - Pedagogical strategy



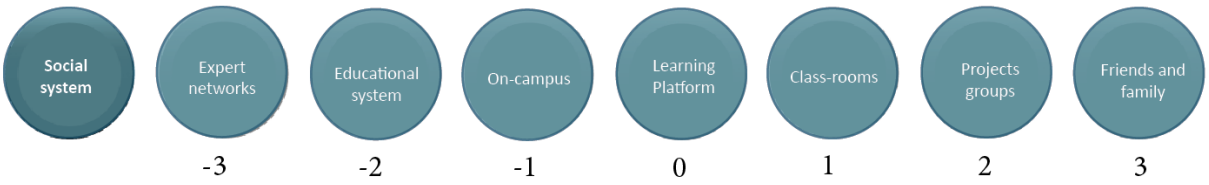
The next system deals with the pedagogical aspects where an ontological view of learning and values must be supported through learning resources and forms of organization. In UnFoLD, it has therefore been vital to create one educational infrastructure that aims to connect people and digital mediated interaction through a theoretical position of learning that emphasise social, relational, and cultural aspects of learning – in this case through experiential collaborative learning (ECL).

Envisioning 3 - Networked learning



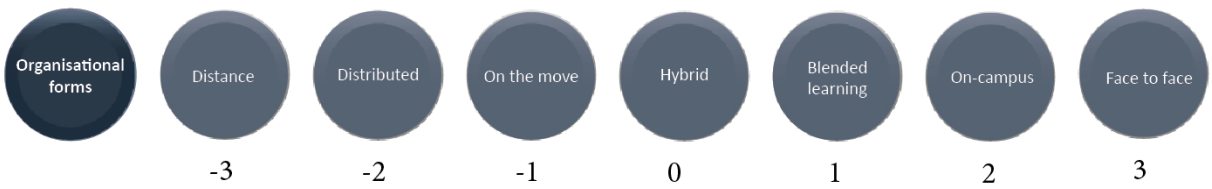
The third level focuses on the elements that makes up a community. In this envisioning scenario a community of practice will, for example, be constituted by the doings and saying created through a normative regulation of behaviour. Likewise, the use of artifacts will affect the professionalism that characterizes a practice. In that understanding, a digital system must be able to embrace the development of a community of practice by supporting, for example, doings and saying, whereby the system's normative intentions must be recognizable to the users in the learning situation.

Envisioning 4 - Social system



The social system deals with the perspectives that lie in both being able to activate an expert network in a learning situation while, for example, social media supports collaboration between students. Next, the system contains several considerations about how organizational forms of hybrid or blended learning can support the development of social learning through the inclusion of technology on a digital platform.

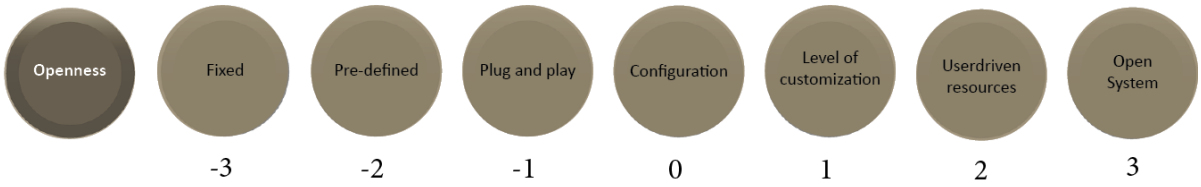
Envisioning 5 - Organisational forms



The social system is strongly supported by the organizational forms of the teaching activities, including the degree of physical presence. The pedagogical and theoretical considerations must be considered in such a way that the technology doesn't become a disturbance to reach the indented goals. The technological solutions must thus support

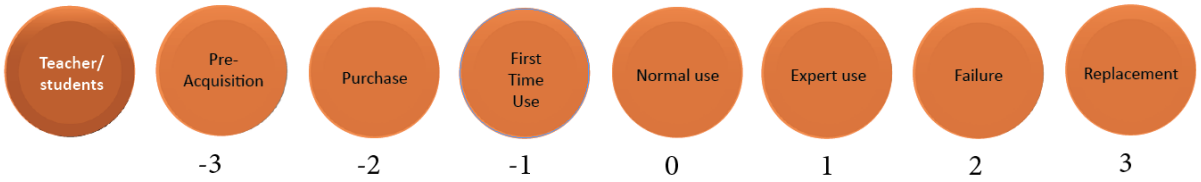
the considerations of values that may exist. It could be, for example, letting the student learn “on the move” in relation to connectivity within a network.

Envisioning 6 - Openness of systems



The next envisioning scenario focuses on the teacher and the students' opportunities to influence the system. Here, a semantic zooming can be described that goes from a system that has been determined and fixed to a system with a large degree of openness that makes it possible to define the use of the technology yourself. This level is particularly interesting when it comes to translating the pedagogical values that characterize the social, relational, and cultural aspects of learning, including ECL. Likewise, the discussion contributes to networked learning through a focus on “open educational resources” to move courses beyond the confines of a particular university module or course.

Envisioning 7 - Interaction with the system



The last level deals with the interaction between teacher and the students within the system. At this level, all functions of the system that users encounter during the teaching situation are mapped. In this regard it is essential that the students' behaviour on the platform supports ECL.

Debating Conclusion

This article has, through presented experiences from a design process, shown how the methodology of envisioning scenarios can be applied to mitigate the risks of implementation technology in a learning situation. We argue that an awareness and mapping of values as a part of the design process is essential and that an increased focus on the ethical and moral responsibilities of designers and involved researchers are important as technologies should not be seen as isolated, value-neutral, or uncomplicated translations of analogue teaching activities. Therefore, while we agree with technology sceptical scholars like Selwyn (2016) and Williamson (2019) who have highlighted the pitfalls of technological implementations in education, we aim to contribute to the ongoing debate by highlighting design methodologies, like envisioning scenarios, which might help to mitigate said dangers if applied rigorously during the design process. This article has therefore presented a preliminary framework for 7 envisioning scenarios developed in the UnFoLD project to elaborate and challenge existing and embedded values in technologies used in Networked learning. We would argue that by applying the term value hierarchy, it is possible though an envisioning methodology to operationalize values into design constrains.

While we recognize that the networked learning community have extensively researched and explored values in design related to pedagogy, and as mentioned, sympathize with any reservations towards technological implementations in educations, we contend that engaging with actual technological design processes and developing methodologies for how pedagogical and didactic values can be brought into and protected in such an engagement, constitute an interesting and under-explored field of research. In this we agree with the notions of Dohn et al. who highlight the problems of how we can begin to work with technologies like AI, algorithms and learning analytics beyond conceptual critiques (2021).

When using technologies in Networked learning we thus emphasize that both designers and stakeholders should engage in a systematic discussion and reflection of values and related judgements while constructing a value hierarchy. Based on a Value-based design methodology, it is possible to create an awareness in the design process

that can transform the conceptual visions into regular and detailed design briefs or technological scripts. This process involves sketching processes, including for example Envisioning Scenarios

The authors hope that this short presentation of envisioning scenarios from an ongoing design process can inspire other researchers and designers to implement value hierarchies, envisioning scenarios, or other similar methods to ensure that pedagogical and didactic priorities are not lost in accommodating marketability, practicalities or technological constraints.

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Teaching with an adaptive technology: Data, acceptance and change

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Abstract

In this paper we present the first findings from a 4 year longitudinal study that investigates the interplay between an adaptive learning technology and educators and students in a nurse education in Denmark. With inspiration from grounded theory we analyse data from 14 hours of classroom observations supplemented by educator interviews, student surveys and mini interviews with students. In the paper we focus on the role of a new technology in the classroom: we ask how data reports from an adaptive learning technology influence educators 'preparations for classroom activities, and we ask how students' technology acceptance evolves over time. Analyzing our data we see three main themes emerge that contributes to answer the research question:

- **Interpretative inclinations:** The adaptive technology contributes to planning the lessons with a recurring inclination in practice: wrong answers lead to more educator presentations, and correct answers lead to student-centred group work during class.
- **Implicit comparisons:** The use of data reveals the educator's expectations and assumptions when she implicitly compares the data on the students with her intuition, and when she compares the technology with the physical book. The implicit comparisons make the use of data challenging for the educator.
- **Reverse adoption:** The students find it hard to grasp the intention of the adaptive technology, but they accept and learn to adapt and appreciate it over time.

In contrast to e.g. Rogers 'technology acceptance theory we find that the adaptive learning technology cannot be evaluated per se: in order to describe how a learning technology is accepted and what role it comes to play in an educational context, the parameter of time is mandatory to include in the research design.

Keywords

Adaptive learning technology, data, teaching and learning, nurse education, learning platforms

Introduction

When considering the interjection of new technology in a learning context, two immediate questions are often posed. First, whether the users will accept or reject the new technology and second what their reasons for doing so are. Underlying these questions are often assumptions that users 'acceptance and rejection, respectively, are expressions of a rational process that weighs pros and cons of the technology *in and of itself* or the impact the technology is perceived to have in a given context. Sidestepping the problematic idea that technological phenomena can be isolated and considered independently (Bruce, 1996), we consider a different problematic aspect of such assumptions. What if decisions to accept or reject a technology in some cases are more strongly influenced by the existing technologies at work in the context than the perceived benefits or drawbacks of the

technology introduced? Or, in other words, what if technologies are accepted or rejected based on *where* they are placed in the network of technologies at work in a given context?

This article discusses preliminary findings of a four-year project following the implementation of an adaptive learning platform, Rhapsode, in nursing education. Adaptive Learning, alternatively known as personalized, responsive or predicative learning systems, is a relatively new technology in the educational field (Fitzgerald et al, 2018) based on data mining and learning analytics (Atkinson, 2015). However, the technology is also the latest embodiment of a longstanding ambition in educational thinking (Friesen, 2020) - to create a system that is able to individualise learning on the fly (Williamson, 2015) in a scalable (platform) solution (Cone, 2021). Attempts to conceptualize how to connect data with didactical decisions are prolific and many-varied (e.g. Anon; Kennedy et al, 2016; Rodríguez-Triana et al, 2015; Sergis & Sampsons, 2017; van Leeuwen, 2015; Wise, 2014). For this project a learning design was put together by a team of educational researchers
working together with educators from the nursing education department, and representatives from the adaptive learning platform company. The design was shaped by the ambition to replace traditional student preparation using textbooks with preparation in Rhapsode. The hypothesis was that generating data on student preparation, understanding of the subject matter and level of confidence would be useful for a teacher preparing classes. Based on the data the teacher could make informed decisions on what emphasis to put on different problems and subject matter; make better didactical choices in teaching methods; as well as differentiate between student groups. Ultimately, the data would free up valuable time in class from having to lecture on the entire curriculum to only problematic areas.

A vital part of the design was a successful implementation of the adaptive technology in the 'educational ecology, ' i.e. a successful adoption of the learning platform as a tool for preparation on par with reading a textbook by the students coupled with a successful shift in preparation practices of teachers where data is consulted informing didactical choices. It would therefore be natural to assume that theories of technology adoption would be pivotal for understanding the implementation process. There is an extensive literature on the subject from different fields such as Information Systems, (Li, 2010), Technology Studies (Straub, 2009), IT management (Taherdoost, 2018), or across disciplines (Alexandre, Reynaud, Osiurak & Navarro, 2018). Naturally, technology acceptance and adoption theories are also found in the field of educational technology as well (Granic & Marangunic, 2019). If we consider a classic theory in technology acceptance, Rogers (1983) point to five elements that are particularly important. First of all there has to be a relative advantage in switching to the technology in question. Secondly, the solution has to be compatible with existing technology. Thirdly, the complexity of the technology has to be at an appropriate level. Fourthly, the technology has to be possible to test in advance; and finally the relative advantages of the technology have to be easy to communicate to all users.

Looking at these elements in the context of our project we find it difficult to explain the acceptance curve of the technology in the project (Authors, forthcoming). We see a movement from a very pronounced, but expected, implementation dip Fullan (2004) to a surprisingly unproblematic acceptance and use of the new technology. In the following we seek out explanations for this movement. The research question is thus:

How do data reports from an adaptive learning technology influence educators 'preparations for classroom activities, and how do students' technology acceptance evolve over time?

Thus, in this paper we relate to the old definition of networked learning as 'learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners, between learners and tutors, between a learning community and its resources '(Goodyear et al., 2004). However, we will focus our attention on the connections between the educator and the students. Considered as an assemblage of tools, artefacts, and infrastructure the configuration of the 'work of school' is a highly recognizable and regimented type of network in action. While being set in its ways (Cuban, 1993), there is considerable leeway for performing improvisations, work-arounds (Alter, 2014) and substitutions making the system an extremely robust network of interactions that are able to persist even when hardware breaks down (switch from slideshow to whiteboard), the teacher is sick (substitute teacher or self-study) or even if a society is suddenly shut down, as has been recently demonstrated in relation to emergency remote teaching (NLEC, 2021). Adaptive learning technologies seem in some respect to cut across existing networks; designed as closed ecosystems in themselves, as they assign fixed tasks to teachers and students in the system while leaving many infrastructural decisions to the system. Such a design threatens to impose a straitjacket on an otherwise flexible system, obliging the surrounding actors in the network to adjust around the system. However, as it is the adaptive system that is the newcomer, much of what follows can be interpreted as the existing network of interactions 'absorbing' the new

system into the network. More specifically, the adaptive learning technology is recognized by the system as a form of 'homework' assigned by the teacher and performed in the system by the students. The novel step added is access to data visualized as reports for the teacher. As such the system manages to accept the system while protecting itself at the same time.

Method

This study draws on a qualitative longitudinal and comparative study, combining several sources of data from a total of 54 students, with a frequency of 6 visits in two nursing education classes. The duration of the study was a total of 90 days, from September 17 to December 16, 2021. The visits were distributed as three visits in cohort A, an intervention group with Rhapsode as preparation, and 3 visits in cohort B with traditional books as preparation. For cohort A, students were encouraged to prepare two days ahead of the class, so that the educator had time to look at the data and plan the class according to the needs and performance of the students.

Visit no. and cohort	Content and number of Rhapsode chapters	Classroom observation	Educator debrief interview	Students group interview	Mini survey
0a	Introduction to Rhapsode	x (online)			
1a	Endocrinology, metabolism (5)	x	x	x	x
2a	Genetics, reproduction (4)	x	x	x	x
3a	Gerontology (1)	x	x	x	x
1b	Endocrinology, metabolism	x	x		x
2b	Genetics, reproduction	x	x		
3b	Gerontology	x	x		

Table 1: Overview of data collection and sources

The strength of longitudinal qualitative research is that it allows for studying changes over time (Saldaña, 2003). As both students and the educator were new to Rhapsode, the gradual process of getting accustomed to using it in preparation for class, was carefully followed and monitored through our research design. Thus, it enabled us to make analytical deep dives into habits and understandings that develop, particularly related to how the educator interprets, plans and acts upon the data provider through student preparation in Rhapsode. In this paper, we are predominantly concerned with the classroom observations and teacher debrief interviews. The purpose of the debrief interviews were to shed light on the instructional choices and actions of the educator and how and to what extent the choices related to data and content from Rhapsode's reports.

The coding process was undertaken with inspiration from grounded theory which is a general and widespread method of analyzing especially qualitative data (Clarke & Friese, 201). Before the formulation of grounded theory, research was traditionally based on a quantitative dataset and a pre-formulated and testable hypothesis, but Glaser and Strauss (1967) showed that qualitative empirical data could also be produced and analysed systematically with a qualitative approach. Thus, grounded theory can be defined as a "theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another" (Corbin & Strauss, 1990, p. 12). Through this methodological approach, our purpose was to identify transversal themes and tendencies in observations and statements from the teacher in an initially broad perspective.

After data collection, all data were imported and coded in a computer-assisted qualitative data analysis software, Dedoose. Although, some research discusses whether the researcher's own analysis and interpretations are challenged when software contributes actively to pointing to links between codes and categories (Glaser, 2003), the contribution of technology can also be considered to only help the structure of data (Hesse-Biber, 2013, p. 327 et seq.). Thus, for this paper, the codes and themes were created during a coding process where themes and codes evolved over time and called for re-coding several times. Analysis in Dedoose showed where in the data set the

codes were used, and the program helped to unveil patterns and themes and to confirm or disconfirm our hypotheses that were thoroughly discussed among us. These emerging and selected themes will guide the points highlighted in the following analysis.

Below we present the emerging themes and findings we saw while analyzing our case-based datasets. As mentioned, we observed six teaching lessons (14 hours) and noted in detail the classroom activities that were taking place. Moreover, we interviewed the educator, Sarah (pseudonym) afterwards to make her elaborate on her preparation for the day's teaching activities. Sarah was not introduced to ideas or concepts of how data could inspire her teaching, and thus the study is exploratory in its nature and sheds light on how she and the students intuitively react and interpret the adaptive learning technology.

Findings

The following findings are examined at eye-level with the participating actors. Based on our analyses, we identified three recurring phenomena and developed a concept for each that highlight the main findings:

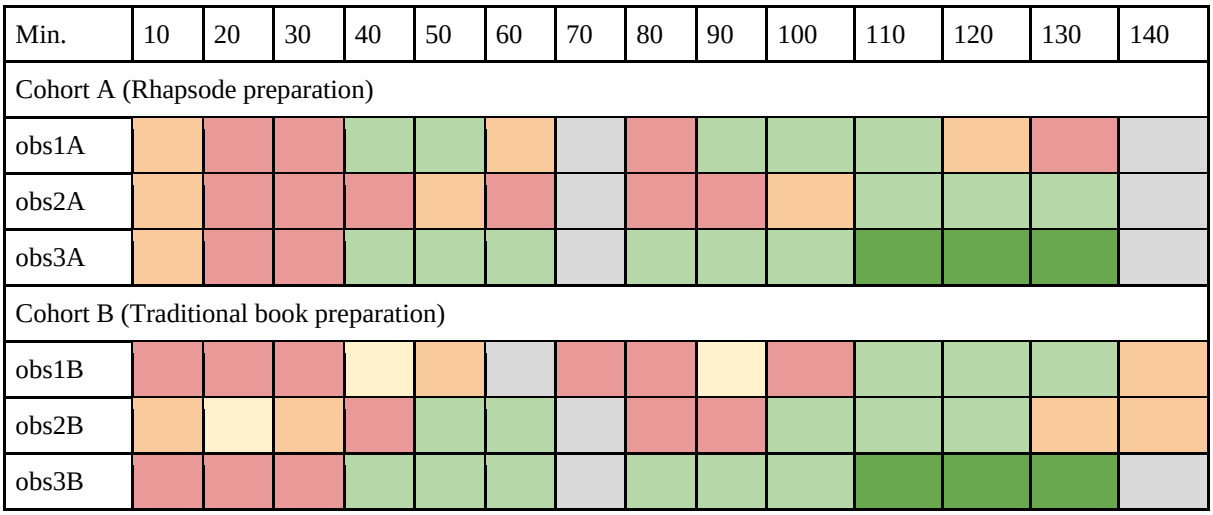
- Interpretative inclinations: Rhapsode contributes to planning the lessons with a recurring inclination in practice: wrong answers lead to more educator presentations, and correct answers lead to student-centring during class.
- Implicit comparisons: The use of data reveals the educator's expectations and assumptions when she implicitly compares the data on the students with her intuition and when she compares the technology with the physical book. The implicit comparisons make the use of data challenging for the educator.
- Reverse adoption: The students find it hard to grasp the intention of the adaptive technology, but they accept and learn to appreciate it over time

Interpretative inclinations: Mastery and lecturing

Throughout the period of observation, we identified what we refer to as the educator's 'interpretative inclinations'. This concept indicates that patterns emerge in how the educator is inclined to interpret relevant data and act upon it. Throughout all observations, when preparing for class, Sarah takes her point of departure in Rhapsode's teacher dashboard to see how the students have prepared for today's lessons. Her main focus of attention is the list of most difficult learning goals.

During preparation for the teaching in the first lessons in cohort A, Sarah sees that many of the students have struggled, and she concludes that she has to present the learning content in class because Rhapsode has not reached the goal of making the students understand the subject matter sufficiently this time. Thus, in the classroom she presents the subject matter that students had struggled with in powerpoint slides (See table 2, observation 1A and 2A). In contrast, when consulting the data for the last lesson (3A), Sarah sees that the students have a lot less problems in mastering the subject matter. Thus, the reasoning for the educator was that there was more time for group work and less need for educator presentations. In the last interview, she explains: "Actually, a lot of the students had it under control, so there wasn't a lot for me to do concerning the "wrong answers." So, I could focus on creating assignments for group work and they could use what they had learned [in Rhapsode]" (Interview with eucator #3A). Supporting the second approach was Sarah's assessment that the subject matter for the last lesson in Rhapsode was structured better in a way that linked the text closer to the questions: short texts followed by relevant questions.

The logic in Sarah's interpretation of data is thus to connect the students perceived mastery level with a need for lecturing. Low mastery leads to class designed around lecturing. A high level of mastery leads to a class design that allows for group work and other formats. Table 2 presents an overview of the classroom activities. When data showed Sarah that the students were struggling, she was inclined to focus the learning activities on more educator presentations and classroom discussions and fewer group work sessions and vice versa. We observed this pattern for cohort A, since in the case of cohort B there was no Rhapsode data to consult.



Legend: Educator presentation Dialogue in plenum' Buzz breaks' Group work Student presentations

Table 2: Kinds of activity during class (based on classroom observations)

When we compare the design of the classroom activities for cohort A with cohort B, we find only few differences. Sarah finishes all her lessons in cohort A before she meets cohort B and the preparation of the cohort A learning activities seem to inspire the ones for cohort B. However, the reasons and the preparational experiences are very different. Whereas table 2 reveals the structure of classes and the kinds of activities initiated by Sarah, it does not tell us how Sarah prioritized different subject matter differently across cohort A and B. The inclination to look at most difficult learning goals also affords a prioritization of what content to include on her slides and the questions to ask in plenum and buzz breaks:

"I gave them different questions this time. Last time [with Rhapsode], there was a great focus on homo- and heterozygotes, so I also asked the students about that. But for me, that was way too elaborated. They will never be required to know this in reality. So this time, I gave them more general questions." (Interview with educator #2B).

Thus, the adaptive learning technology, from the perspective of Sarah, affords her to prioritize the learning goals they struggle with even though she professionally deems them of less relevance to their professional practice.

Implicit comparisons: Challenging data and technology

The students 'digital footprints in the learning platform are presented in a dashboard through data reports which only the educator is able to access. The reports give insights into how much time the students have spent while preparing for class; how many times they try to answer a question before getting it right; whether they answered all questions and so on. The data is therefore a source of knowledge on students' preparation and mastery that is usually unavailable for the educator. During the first interview, Sarah says the following: "It is a strength: I see things that I didn't expect. E.g., the function of the bile, I didn't expect it would be here [among the difficult goals]" (Interview with educator #1A).

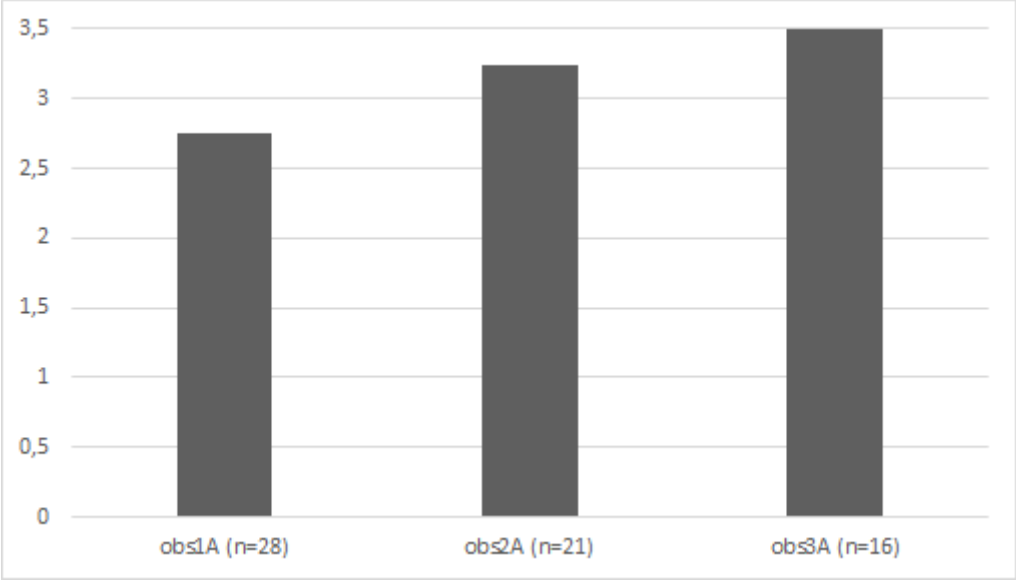
Based on such insights and other platform data, Sarah prepares for the next day's classroom teaching. When Sarah expresses surprise, disappointment, or when she assesses the technology or the performance of the student, we interpret these as a result of an 'implicit comparison 'with her 'normal 'expectations. For example when the content that Rhapsode presents to the students differs from what she - through exercising her professional judgement - finds important, when the students spend more or less time than she expects, or when they struggle with other objectives than she would intuitively expect. The reports and the technology thus serve as a mirror of what Sarah prioritizes and expects and creates an image of her assumptions. Such implicit comparisons are important, because they hint at the educator's normal framing of such matters as 'preparation before class. '

Despite the above statement that having access to data is a strength, Sarah expresses a preference for class preparation using traditional physical textbooks. The Rhapsode technology is far from perfect in her opinion because of technical challenges for her and for the students, and because the learning content in Rhapsode is chosen

by her colleagues and not by her. Moreover, as the content is transferred to the platform from textbooks that are not familiar to her, Sarah finds it challenging to navigate and get an overview of the different themes and chapters. The textbook serves as an implicit frame of reference in her judgement of the technology. When she uses a traditional book for the students 'and her own preparation, she "feels sure that the students learn what they are supposed to learn, and I could supplement it, if I chose to do so" (interview with educator #3A). With the physical textbook, Sarah plans the lessons based on her intuitive knowledge about what students need to learn. During the first interview concerning her teaching in cohort B, she explains: "I know by heart what the students need to know out there [at the hospital] … whereas in Rhapsode, I had to check everything: what are their answers? What is difficult? … The preparation [this time] has been much more uncomplicated, and it has taken a lot less time. A lot less!" (Interview with educator #3B).

Reverse adaption: Reactions change over time

All three observations of cohort A included short interviews with students that self-identified as positive, neutral, or negative, respectively, towards the Rhapsode technology and their use of it for today's lessons. The interviews were conducted during a break. Through analysis of the interviews, a pattern emerged: Although it was the technology that was supposed to adapt to the students, a gradual reverse adaption also took place. By this we mean that the students 'understanding and appreciation of the technology also gradually changed over time. The finding is also mirrored in mini surveys conducted at the beginning of each class (see figure 1). Here, each class of students were asked to rank Rhapsode on a list of five modalities of preparation. The tendency here is also that over time, students 'tend to rate Rhapsode higher. Note the decreasing number of respondents.



Description: Data are too limited for analysis of statistical significance, and thus the chart only serves to validate the qualitative findings.

Figure 1: Students 'average rating (1-5) of Rhapsode over time in cohort A

At the initial interviews the students mentioned several times that they had trouble understanding how Rhapsode adapts to them (cf. Authors, forthcoming). A student put: "Sometimes it [Rhapsode] asks you questions without presenting the text first. I had no background to answer from, and that was a bit frustrating. I did tell it [Rhapsode] that I was a beginner" (Interview with students, #1A). Although the educator had told the students that Rhapsode's adaptive engine is designed to find out what the student knows in order to present only new learning content, the students seem to continue to expect a type of adaptivity that an educator would aim for by modifying the difficulty level.

The last interview with students (interview with students #3A) drew a very different picture compared to the former ones (interview with students #1A + #2A). First of all the interview group had a different composition as all present students self-identified as positive toward the technology. There seemed to be little to no neutral or negative

experiences when the students used Rhapsode the last time. One participating student explained why during the interview: “It was very confusing to begin with [the first time she used Rhapsode], because it was this new way of learning, and you didn’t know how to do it the first semester.” To the question of how it was different this time, she answers: “The texts were short, and the questions were there to confirm [if you understood correctly]”. When the interviewer asked the student whether she believed that the shift in experience was due to Rhapsode or to her own way of working with it, she said: “Well, I do think it was different this time, but I also feel that my way of working with Rhapsode is completely different now compared to the beginning of this semester.” (Interview with student #3A).

The reverse adaption not only applies to the students. Sarah explained that she had now established a practice on how to navigate, prioritize and translate the observed data from the reports into teaching: “[This time] I spent only two or three hours on preparation, not very long” And later she explains that the next time she is to use Rhapsode, she will need shorter time to prepare: “I can easily make it the day before. No problem”. Moreover, she explained that the way she initially used the data, had at the end of the semester turned into her new standard practice: “[I use them] the exact same way, yeah” (Interview with educator, #3A).

Discussion

Still considering the findings as they were experienced by actors involved, our immediate attention is centered on the novelty for teachers of consulting reports in their preparation work. The data reports generated from the students ’digital footprints in the digital platform were visualised as reports in an educator dashboard and showed the educator how the students had performed while preparing for today's lesson. The educator’s interpretive inclinations were to consult these data and assess whether she had to supplement Rhapsode by presenting the subject matter again in class or whether she could focus on letting the students work independently in groups. Although it was time consuming and challenging to begin with, the educator eventually established her new preparation routines based on the data. However, even in the end, she found it very time consuming to prepare when she had to take the students ’data into account. Nonetheless, the data made her center the activities more on the specific group of students. The data reports can therefore be said to have had a direct impact on the educators preparations for classroom activities. However, the reports did not prescribe (cf. Donoghue et al., 2019) the classroom activities; when diving deeper into the data, the educator implicitly compared the reports with her former experiences, expectations and assumptions about the students and the subject matter. Rather than determine the educator's choices, the data served as a sounding board for the educator’s preexisting ideas for classroom activities. The educator combined the subject matter presented in Rhapsode with activities chosen based on professional reflections on nurse competencies. As for the students ’technology acceptance, we saw that time also was a crucial factor. It took three months of practice for the students to adapt to the special way of preparing for class that Rhapsode demanded, but by then they saw a relevant learning outcome potential in the technology.

Returning to the question of how the adaptive learning platform was adopted, the above findings present a somewhat counter intuitive picture. Going by the students enthusiasm a rather straightforward story could be told. Starting with initial frustrations from having to figure out a new technology as well as a new preparation practice (i.e. the implementation dip as described by Fullan (2004)), the students got used to the technology during the semester and they adapted to it. In addition they had fewer wrong answers and seemed to struggle less. All of which leads to an upward trend that would explain the entirely positive students at the last interview. Seemingly the technology has been adopted with few complications. However, when we interpret the data through Rogers (1983) five elements of particular importance mentioned in the introduction, we see a different picture. Sarah actually identifies a relative advantage in using the Rhapsode technology, i.e. identifying troublesome subject areas. Nonetheless, she expresses a clear preference for the traditional textbook over the platform. Its perceived advantages do not outweigh the perceived disadvantages for her, due to the technology’s level of complexity, the unfamiliar interface and the shifts in preparation practices for students and teachers. The students seem to presume that the system carries a relative advantage qua the system’s adaptability, but their acceptance cannot be taken at face value as they seem to lack an understanding of how the system actually adapts. In other words, the relative advantage has not been communicated. The two remaining factors do not provide further clues. By the very nature of the project the technology has been possible to test in advance and given the declining level of frustrations the complexity seems to be at an appropriate level. But these seem to only provide vague reasons for students to actually adopt the system.

Conclusion

Part of an explanation can be found in the themes that have emerged. Through the implicit comparison of the adaptive learning technology with the traditional analogue technology of a textbook, we see that Sarah is not trying to substitute the former for the latter. Rather she is evaluating its potential use as one tool among others. The technology, thus, does not need to have a relative advantage over its competitors. It only has to prove its relative usefulness, i.e. that it cannot be considered redundant compared with the existing tools. The adaptive technology thus occupies the same place as a textbook for the teacher. By the same logic we can understand the interpretative inclination. While the adaptive learning platform provides hitherto inaccessible data about student preparation for the teacher, Sarah ties in the data with didactical considerations and choices that would otherwise have been based on her experience and professional assessment of what the students need. Emphasizing how she sees the textbook as having a more optimal balance in the relative weight of choices of subject matter and at the same time taking time to address material experienced as difficult by the students is a way to stay loyal to the material not chosen by her in the adaptive platform, while maintaining a professional distance to that particular choice. Given that the student body only was exposed to the adaptive learning tool in this particular class, we might infer, in a similar manner, that it took time for the students to get used to the technology, but once habituated took to it as an alternative form of preparation. A decisive factor might be that the learning modules at the end took comparatively less time than the ones in the beginning.

In network terms the above can be stated as the network exhibiting its ability to absorb a new technology into existing patterns and schemes. The adaptive learning system is placed in the same category as textbooks, video material or in short, ressources, available for an already acknowledged activity 'homework.' As such the decision shifts from technology acceptance to technology evaluation. The technology only needs to be accepted as a viable alternative to other ressources and is subsequently placed in the network at an accepted slot, i.e. 'preparation for class.' The novelty in the availability of data for the teachers preparation, does not disturb the existing network, as the data is lumped together with and weighed against the teachers existing cache of experience and professional judgment. Overall, we found that the adaptive learning platform shows some budding promise as a tool for preparation for students and as an innovation in preparation practice for the teacher. But for this particular set of data it seems that its acceptance has more to do with how it fares as an alternative to the textbook, and the fact that it can be implemented in an educational practice in a way that only requires minor, albeit concentrated, adjustments in student and teacher practice.

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What kinds of social network groups do teachers find useful?

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Abstract

This paper presents results from a survey of teachers describing their two most useful Facebook groups (n=108 teachers). It addresses a gap in the literature, in that many studies investigate teachers within certain Facebook groups, but little is known about the types of groups that teachers-who-use-Facebook find to be most useful. Analysis of the survey results looks at the privacy, thematic focus, and regional focus of groups that teachers report to be useful. The study also addresses the question of "what kinds of peer support do teachers find within these useful Facebook groups?" The results show that useful Facebook groups tend to be private, positioned at a state/jurisdiction/national level, and have a clear thematic focus. Results also show that within these useful Facebook groups teachers report high levels of pragmatic support, with lower levels of modelling of practice, reflection and feedback, meaningful connections, and emotional support (in that order). The paper discusses the significance of these findings with respect to issues of policy, design, and facilitation of Social Network Sites (SNSs) as well as teacher preparation for competencies to thrive within SNSs.

Keywords

Teacher, Facebook, social network site, private, public, open, closed, theme

Introduction

Teachers use social network sites (SNSs) extensively in the context of a changing profession and a world that has become more networked over recent decades (Jones, 2015). Most teachers appear to make use of SNSs such as Facebook and Instagram (Kelly et al., 2014; Sumuer et al., 2014). Much of what teachers do within SNSs constitutes *networked learning* which is defined as "processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (Networked Learning Editorial Collective, 2021, p. 319). Networked learning provides a "language and a way to conceptualize learning activity as deeply grounded on *connections* between people, ideas, and things" (Gourlay et al., 2021) and recognises that the *setting* within learning occurs matters (Goodyear, 2014). While Facebook may not be the most convivial of technologies, it does provide a setting within which teachers develop connections and support one another through collective inquiry.

It is a platform that remains highly significant for the teaching profession. However, actionable knowledge from research about how Facebook might better support teachers' networked learning has large gaps, despite over 20 years of research into this domain (Kelly et al., 2021; Lantz-Andersson et al., 2018; Macià & García, 2016).

There is much diversity of types of groups of teachers within Facebook. Following their review of 96 studies of teachers in SNSs, Kelly et al. (2021) suggests that studies of groups of teachers within a SNS should report on six key properties, to be able to make meaningful comparisons between groups. Together these properties provide a characterisation of the *type of group* within a SNS that is being studied, through: (1) the size of the group (number of members, ideally with some indication of levels of activity expected for inclusion); (2) its origins (formal/informal); (3) its privacy settings (open/private); (4) its thematic focus (if one is present); (5) its regional focus (if one is present); and (6) the platform being used (e.g., Facebook). Often, some of these properties are difficult to establish—it is difficult for researchers to know the origins of a group and participants rarely know its size when asked. Yet an understanding of as many of these characteristics as possible allows for meaningful comparison between groups in SNSs and for convergent validity of findings across multiple studies over time (Kelly et al., 2021).

The present paper provides an understanding of *which kinds of Facebook group teachers report as being useful* as well as *the kinds of peer support that they are finding within these groups*. The paper was motivated by contradictory findings in studies of teachers in SNSs, in relation to the kinds of peer support that they report (Kelly et al., 2021; Lantz-Andersson et al., 2018; Macià & García, 2016). On the one hand, there are claims that teachers find deep forms of peer support within Facebook groups in the form of practice being modelled, feedback about practice being provided, and support for reflecting on practice. For example, Ab Rashid (2018) found for 34 English language teachers that their involvement in a Facebook group "contribute[d] to the development of their professional lives in the sense that it enable[d] them to dialogically reflect on the teaching-related experiences encountered" (p. 114). On the other hand, there is evidence that teachers do *not* find this kind of deep engagement, and instead find mostly superficial support in the form of pragmatic information and shallow social connections. In a study of five large, open teacher groups within Facebook, Kelly and Antonio (2016) found that there was "scant evidence of online support for reflection on practice, feedback about practice or modelling of practice, all forms of support that the theory stresses as important for teachers" (p. 148). A key factor in these seemingly contradictory findings is that not all Facebook groups are the same because, in short, teachers do different things in different kinds of group (Kelly, 2019). The challenge that remains is to gain a deeper level of understanding of which kinds of group are useful for which kinds of peer support (Kelly et al., 2021). As state, there is a need to "move beyond discussions of Facebook being either 'good' or 'bad'; 'empowering' or 'oppressive'" (Bergviken Rensfeldt et al., 2018, p. 247) to more deeply consider future possibilities for its use.

The paper is also motivated by the fact that there are many studies that provide a deep understanding of how teachers are supporting one another within this or that particular group in a SNS, as three recent reviews have described in depth (Kelly et al., 2021; Lantz-Andersson et al., 2018; Macià & García, 2016). There remains a lack of understanding of *which kinds of group* are useful for different kinds of support—where many studies do not adequately report on the type of group being studied preventing any kind of meta-analysis from past work (Kelly et al., 2021). This paper presents findings from a study that begins to address this gap by investigating two research questions:

(1) What *kinds of group* do teachers report as being their two most useful Facebook groups?
(2) What *kinds of peer support* do teachers report finding within their two most useful Facebook groups?

Background

Studying teachers in Facebook

Facebook is just one of many SNSs, where SNSs are defined as a "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system" (boyd & Ellison, 2007). Facebook has long been one of the most widely used SNS in the English-speaking world (Junco, 2013) and is popular amongst teachers.

Two prior studies address aspects of the two research questions directly. Firstly, Ranieri et al. (2012) conducted a survey of five Facebook groups (n=1107) to study the mechanisms underlying group membership and teachers' perceived impacts upon their professional learning. The found an unexpected result that teachers in groups with a

generic focus, rather than a thematic focus, reported greater impacts on their 'real life'. They also found that teachers in generic groups reported more information sharing while teachers in thematic groups had more emotional support. Secondly, Kelly and Antonio (2016) looked at the kinds of peer support that were observed amongst teachers within five large open Facebook groups, discussed in more detail below.

Specific groups in Facebook have already been studied in-depth to understand different dimensions of teachers' networked learning. For example, Ab Rashid (2018) has looked at dialogic reflection amongst English teachers in Facebook. Chuang (2016) have studied teachers' use of Facebook to develop culturally responsive teaching. Confusions resulting from teacher use of Facebook for crossing personal-professional boundaries have also been explored Fox and Bird (2017). Facebook has been established as useful for developing a portfolio for preservice teachers by Kabilan (2016). Mixed methods have been strategically used by Lantz-Andersson et al. (2017) to understand the sharing of teachers' norms, skills, and competences within a Facebook group. A limitation on all of these (and other similar) studies is that they focus upon particular Facebook groups as the objects of study. There were no studies that could be found within the literature that asked a general population of inservice teachers about which groups they found most to be useful.

Finally, the discourse around how teachers develop their own *professional learning networks* (PLNs) is relevant here in understanding the kinds of groups that teachers use (Trust et al., 2016). There are competencies that teachers can possess for being able to find and engage with useful SNSs (Trust & Prestridge, 2021).

Peer social support within Facebook

The peer social support that teachers find within Facebook groups has been widely documented (e.g., Kelly & Antonio, 2016; Lundin et al., 2017; Macià & García, 2016). Peer social support is characterised by House as a response to the question of: "who gives what to whom regarding which problems?" (House, 1981). The lens of peer support can be used to describe the way that teachers' social relationships lead to positive professional outcomes, in terms (in this study) of online relationships within Facebook. Table 1 shows five types of social support that teachers find within Facebook groups. The development of this table follows the work of Kelly and Antonio (2016) in combining House's (1981) initial categories of social support with certain roles that teachers fulfil for one another, as described in a review by Clarke et al. (2014). Table 1 aims to capture a shift from *roles that teachers play for one another* (a response to House's question above) towards *types of support that teachers perceive their online groups to provide*. In making this shift, two categories from Kelly and Antonio (2016) have been refined as described in Table 1.

Types of peer support found in teacher Facebook groups	*Roles of teachers in providing online peer support (Clarke et al., 2014; Kelly & Antonio, 2016)*	*Description and rationale (following Kelly & Antonio, 2016)*
Support for reflection and feedback on practice	Providers of feedback Supporters of reflection	Teachers use the group to access feedback about the what, why, and how of practice. The group may prompt reflection by offering suggestions, providing. supportive commentary, and advice. *Categories merged due to challenges in coding observed by Kelly and Antonio (2016)*
Support for meaningful connections	Agents of relationships	Teachers use the group to initiate and maintain relationships with other teachers and facilitate new connections.
Support from modelling of practice	Modelers of practice	Teachers look to one another for images of how to teach, through descriptions teachers provide of their own and others' practice.
Emotional support	Agents of socialisation	Teachers find empathy, comfort, and reassurance within the group. *Category modified based upon House (1981) to fit the group level and resolve lack of clarity observed during coding by Kelly and Antonio (2016)*
Pragmatic support	Advocates of the practical	Teachers assist each other with day-to-day problems and find pragmatic ways to work.

Table 1: Types of peer support within Facebook groups

Methods

A survey approach was used to gain insight into these research questions. An instrument was developed with questions that focused upon the two Facebook groups that teachers found most useful. Of the six properties that characterise teacher groups in SNSs (Kelly et al., 2021), only four were considered for all groups: privacy, regionality, thematic focus, and platform (which was Facebook in this study). Participants were not asked about the group size or about origins of the group (formal/informal) as they were deemed unlikely to have enough knowledge of these variables to provide a useful response. The study received institutional ethics approval.

Data sources

A survey instrument was developed with 37 questions. Questions in the survey asked participants about demographic information (experience in teaching, teacher identity) as well as use of Facebook (in general), other social media platforms used, and the two Facebook groups "most useful to you as a teacher". For each *most useful* Facebook group, participants were asked for a description of the group, why it was useful, its privacy setting, the duration and quality of participation in the group, as well as five Likert scale questions about forms of peer support present within the group. Table 1 shows questions relevant to the analysis in this paper. The two variables of clarity of focus (thematic focus), and regionality of groups were coded using supplied information (refer Coding and analysis section).

Question	*Response options*
Please list the two Facebook groups that you find most useful to you as a teacher	Free text
For each group:	
What are [that group]'s privacy settings?	• Private (closed, with approval needed to join) or Secret (hidden and closed) • Public (open)
Please describe the focus of [that group]. For example, does it address a particular theme or relate to specific location or region?	Free text
Why is [that group] a useful Facebook group for you?	Free text
How many years (approximately) have you been a part of [that group]?	Integer
Does [that group] support you in developing meaningful connections with other teachers:	5-point Likert scale from Strongly Agree to Strongly Disagree
Is your membership of [that group] a source of emotional support	5-point Likert scale from Strongly Agree to Strongly Disagree
Is reflection and feedback encouraged in [that group]?	5-point Likert scale from Strongly Agree to Strongly Disagree
Does [that group] provide pragmatic support (e.g., a place to find resources):	5-point Likert scale from Strongly Agree to Strongly Disagree
Do the teachers in [that group] describe or model their teaching practice within the group?	5-point Likert scale from Strongly Agree to Strongly Disagree

Table 1: Selected questions from the survey

Sampling and limitations

Participants for the survey were recruited through Facebook advertising, and where the survey remained open for 6 weeks in 2020. Due to Facebook advertisements criteria, there was a bias towards participants in Queensland Australia. Any teacher from any nation was welcome to respond, which was limited to early learning, primary, and secondary teachers (tertiary educators were excluded). Responses were received from 114 respondents of which 108 were valid (had at least one Facebook group with complete information). This included 8 teachers who only included information about their most useful Facebook group, but not the second most useful. Analysis took place at the level of *group* (rather than participant) leaving 208 Facebook groups with complete information were

included in the study (i.e., the most useful and second most useful were included for most participants; some did not successfully complete the 'second most useful').

The study was limited in three ways in terms of the sampling. Firstly, only teachers who were already using the Facebook platform were invited to participate. Secondly, only teachers who chose to respond to the call for participants were included, representing a self-selected group of participants. These are significant limitations upon the sample that limit generalisability (a widespread issue within the literature on teachers in SNSs as described by Kelly et al., 2021). The sample size is extremely small in comparison with the population of teachers who use Facebook; it should in no way be considered a representative sample, as the study was not limited to any one country. Additionally, only English-speaking teachers were invited to participate in the study, which limits any claims about how these results might transfer into other language contexts. Finally, the participants were recruited through Facebook advertising. Facebook's algorithms represent a black box to researchers in terms of knowing who has seen the advertisement and in what context (Kosinski et al. 2015).

Coding and analysis

Two of the questions required coding prior to analysis: each of the two Facebook groups cited by respondents was coded for *regionality* and for the presence of a *clarity of focus* (does the group have a theme?) as suggested by Kelly et al. (2021). This was done using the coding scheme outlined in Table 2. Each participant specified their top two most useful Facebook groups. Coding was performed for both of these variables using a heuristic of:

(1) is [regionality/focus] clear from the title of the group? If not clear, then:
(2) is [regionality/focus] clear from the description of the group given? If not clear, then:
(3) look the group up on Facebook to see if the [regionality/focus] is discernible

All groups were coded (n=208) by two different raters. Cohen's κ was run to determine if there was agreement between coders for these two variables of regionality and clarity of focus. There was substantial agreement between coders for both of these variables (Altman, 1990), where regionality $\kappa = .702$, $p < .0005$ and clarity of focus $\kappa = .763$, $p < .0005$.

Variable	Description	Values	Description
Regionality	Does the group specify a connection to a specific region?	International	Explicit international focus (e.g., 'worldwide')
		National	Nationwide focus (e.g., 'Australia')
		State/jurisdiction	Statewide focus (e.g., 'Maine')
		Local/school	Local region/city/area (e.g., 'Queenstown') or school
		None	Unspecified regionality
Clarity of focus	Does the group have a clear focus specified?	Clear focus	Specified subject area ('English'), year level ('prep'), or area of interest ('remote teaching support')
		No focus	No specified subject area

Table 2: Coded variables and descriptions

Findings

What kinds of group do teachers report as their "most useful"?

Table 3 shows findings with respect to the groups that teachers reported as being the most useful and second most useful Facebook groups. Similarity was observed between the *type of group* that teachers described as being their most and second-most useful groups. The main exception to this trend was in regionality, where most useful groups were most likely to be state/jurisdiction based (51%) whereas second-most useful groups were only 28% likely to be state/jurisdiction based and were most (31%) likely to be international.

Considering the full set of 208 Facebook groups reported by teachers (which we will describe as 'groups that teachers found useful'), it is notable that teachers overwhelmingly reported that the groups they found useful were *private* (86%) rather than public (14%). They also found to be useful groups that were *state/jurisdiction focussed or were national*, with a combined 66% compared with 27% that had no region specified and just 7% that were

either international or local/school. The groups that teachers found useful groups were also more likely to have a *clear thematic focus* (69%) than not (31%).

Variable	***Most useful only***		***Second most useful***		***Both groups***	
Privacy	*n*	%	*n*	%	*n*	%
Private (closed or secret)	95	88%	84	84%	179	86%
Public (open)	13	12%	16	16%	29	14%
Total	108	100%	100	100%	208	100%
Regionality						
International	4	4%	6	6%	10	5%
National	23	21%	31	31%	54	26%
State/jurisdiction	55	51%	28	28%	83	40%
Local/school	2	2%	2	2%	4	2%
No region	24	22%	33	33%	57	27%
Total	108	100%	100	100%	208	100%
Focus						
No focus	30	28%	34	34%	64	31%
Clear thematic focus	78	72%	66	66%	144	69%
Total	**108**	**100%**	**100**	**100%**	**208**	**100%**

Table 3: Characteristics of teachers' most useful (self-report) Facebook groups

What kinds of peer support are occurring within these groups?

The groups that teachers found most useful were a frequent source of pragmatic support, which was reported to occur within 89% of the groups, Table 4, where teachers were provided with "a place to find resources" as an example of what pragmatic support looks like. This can be contrasted with emotional support, which was reported to occur within just 51% of groups. Seven participants who responded to every other question in the survey chose not to respond to this question and these were coded as "No or neutral"—this was the only question that had any instance of no response in the included sample. 70% of groups were reported to be a place where modelling of practice occurred, compared to 64% and 63% of groups for reflection and feedback and meaningful connections respectively.

Type of peer support	***Yes***		***No or neutral***		***Total***	
Meaningful connections	130	63%	78	38%	208	100%
Emotional support	106	51%	95	49%	208	100%
Reflection and feedback	132	64%	76	37%	208	100%
Pragmatic support	184	89%	24	12%	208	100%
Modelling practice	146	70%	62	30%	208	100%

Table 4: Types of peer support reported in teachers' most useful (self-reported) Facebook groups

Discussion

RQ1: The kinds of groups that teachers find useful

Within the stated limitations, these data provide a characterisation of the kinds of groups within SNSs that teachers find useful. It is significant for research in this domain that teachers overwhelmingly report groups that are *private* as being their most useful groups. This fits with the hypotheses of earlier studies that the most important activities of teachers may be happening within private groups (Kelly & Antonio, 2016; Mercieca & Kelly, 2018). It fits with well-established theories around communities of practice, that the spectrum of openness-privacy affects the dynamics of participation through establishment of trust (Macià & García, 2016; Wenger et al., 2009). *Methodologically, researchers studying open groups of teachers may not be looking in the right places if they wish to understand where significant professional learning is occurring.*

The results further suggest that teachers find groups useful that are at state/jurisdiction/national levels, but less so at an international level, local level, or a group with region unspecified. This seems pragmatic and entirely

predictable, given that syllabus content, teacher registration, and teacher membership of a school system all occur at these same levels (of state/jurisdiction/national) in many (if not most) countries.

Thematically, teachers report within their top two most useful groups more of the groups that have a clear thematic focus (69%) than groups that do not (31%). This contradicts the findings of Ranieri et al. (2012) who suggested that groups without a thematic focus might be more useful. The discrepancy in results may be due to the sampling of Ranieri et al. (2012) who recruited teachers within five Facebook groups, which is likely to bias responses to this kind of question. The finding here, that teachers find report groups with a thematic focus as their most useful groups, fits with the theory that teachers will want to participate in groups that align with their professional practices (Lave & Wenger, 1991). This is to say that for any particular context (a teacher within a school system, within a school) there will be a level of identity that fits their needs best.

There are competing tensions between larger groups being more useful through having more activity and greater amounts of knowledge from experience; yet a diluting effect can be seen when the practices within such a large group are not aligned (Clara et al., 2017). Any repeat of the study described here should include the *size* of these groups that teachers report as being their most useful to understand this effect. Anecdotally, many of the groups stated by teachers as their most useful appear to be *large* (between 200-2000 members) but further investigation is required. A formal analysis of the size of teachers' groups is not possible, due to the passage of time since the survey was carried out—a further limitation of the present study.

Despite these (significant) limitations, the results do provide the best indication yet of the kinds of groups that teachers find to be useful, which can be characterised as private, state/jurisdiction/national, and thematic (often related to subject area). Further investigation is required to confirm these findings and to further explore the size of groups and their origin. It may become apparent through such work that there is indeed a 'sweet spot' for groups that seems to be a good match between the affordances of the technology (i.e., Facebook groups) and the needs of teachers. More likely is that more will become known about the contexts within which certain groups are useful for certain teachers and the relationships between the design of online platforms and knowledge about "who gives what to whom regarding which problems" (House, 1981).

RQ2: The kinds of peer support found within those groups

The findings with respect to RQ2 can be contextualised through consideration of the conclusions from the study of Kelly and Antonio (2016). A key finding in that study was that the large, open Facebook groups showed a great deal of pragmatic support (66% of all on-topic posts) and some meaningful connection-making being supported (21% of all on-topic posts), but far less evidence of other kinds of support (13% combined). These findings were established through discourse analysis of what teachers were actually saying, in contrast to the present study which relies upon self-reporting of teachers' perceptions of their groups. It is then interesting that the survey results presented in this paper produced a similar result in terms of the dominance of pragmatic support, where 89% of most useful groups were reported to be a source of pragmatic support. This represents convergence in evidence around the idea that pragmatic support (most notably the sharing of resources) is the primary kind of support accessed by teachers within Facebook groups of any kind, a theme touched upon in the review conducted by Lantz-Andersson et al. (2018).

Further investigation was carried out to look at the associations between *privacy* and the *types of peer support*, Table 6, using Fisher's Exact Test to measure these associations. It is interesting in these results that modelling of practice seems to be strongly associated with private groups—perhaps because of the greater trust that these private spaces engender. In contrast, teachers seemed to find (or not find) support for reflection and feedback within both private and public groups; there was not a significant association with privacy.

The level of emotional support (51%) across all groups is low when compared to other kinds of support. They could equally be seen as high considering the barriers to emotional connection that are present within Facebook as a platform. The term "emotional support" is so loaded—and likely to mean different things to different respondents—that not much should be made of this finding, which lends itself to more qualitative methods of study.

Type of peer support	***Association with privacy variable (Fisher's Exact Test)***
Meaningful connections	0.017
Emotional support	0.818
Reflection and feedback	0.256
Pragmatic support	0.015
Modelling practice	0.004

Table 6: Types of peer support reported in teachers' most useful (self-reported) Facebook groups

Towards actionable knowledge

A framework for moving towards actionable knowledge with respect to teachers in SNSs was proposed by Kelly et al. (2021). It considers domains of change as: (1) *policy* regarding teachers in SNSs (and related funding); (2) *design* of SNSs (the setting); (3) *facilitation* of SNSs (and design for learning within them); and (4) *teacher preparation/competency* for using SNSs. The present study gives insight into the kinds of groups that teachers find useful, as well as the kinds of peer support that are associated with those groups. A number of hypotheses for these domains of change can be proposed in light of this work:

- **Policy:** Formal institutions such as governments, teacher education institutions, and teachers' associations might use these findings when deciding upon the types of groups to convene to support their teachers. This might involve making groups private, keeping them at the state/jurisdiction or national level, and giving them a clear thematic focus.
- **Design:** The study doesn't say much about the design of SNSs as it is focussed upon the commercial platform of Facebook. However, the proposal for *fractal design* of online networks—in which there is affordance for both large open spaces to leverage large networks and smaller private spaces for trust—still fits with the present findings (Clara et al., 2017; Holmes, 2013)
- **Facilitation**: Further investigation is required into the significance of facilitation for these findings. Nothing is known about how/whether the groups included in this study were facilitated. How might facilitation change the mix of peer support found within a group?
- **Teacher preparation for use of SNSs:** There are already well-argued proposals for teachers to learn competencies required to make good use of SNSs (Trust & Prestridge, 2021). The present findings may form part of such a curriculum, in having expectations of what kinds of support they are likely to find in different places (e.g., pragmatic support within Facebook) as well as which kinds of group to look for (e.g., joining private rather than public groups, thematic rather than unfocused groups, etc.).

Conclusions and further research

This paper has presented early findings from a study of the types of Facebook group that teachers find useful. It has clearly stated its limitations due to sampling. Despite these limitations, the findings help to confirm two hypotheses that are present within the literature: that it's more likely for a private (rather than public) group to be among a teachers' most useful groups; and that pragmatic support (e.g., sharing of resources) is the primary way in which teachers support one another within Facebook. The approach used in this paper, of asking a generalised population of teachers (i.e., not recruited from within one or a few existing groups), may be useful for future studies as a way of understanding what kinds of peer support teachers find in different kinds of group.

This work towards understanding teachers in SNSs is relevant for the broader field of networked learning. It contributes towards knowledge about teachers' forms of collective inquiry and knowledge creation and the way that relationships and technologies underpin them. It does this, primarily, by contributing to an understanding of the context of teachers' networked learning in SNSs and methods for researching this domain. Often, researchers wish to study the networked learning within one particular group of teachers within one particular platform (Kelly et al., 2021). The work described here helps to understand both *which* groups might be a focus for study, as well as the *context* for those groups alongside teachers' perception of that context.

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Tipping the canoe: What can be learned from a postdigital analysis of augmented and virtual reality in networked learning?

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Abstract

In this paper, the authors use a postdigital lens to examine augmented (AR) and virtual reality (VR) as potentially effective tools for networked learning. The postdigital perspective suggests that the 'digital' is so pervasive that it is no longer considered novel or noteworthy; rather, it is so embedded in our day-to-day lives that it now evades notice. This examination draws upon the concepts of analogue and digital to explore ontological and epistemological characteristics of AR and VR as well as how media and materials may shift on a continuum or manifest both characteristics concurrently. Two vignettes are used to create a shared context and atmosphere from which to consider the pedagogical use of these technologies. One vignette describes a VR app that invites the learners into a canoe where they are immersed into a lesson about Indigenous constellations; the second describes an AR app in which the learners direct their smartphones up at the sky also to learn about constellations. While the learning goals are similar, the experiences are differently nuanced. The paper offers a discussion of considerations that may be useful in designing learning experiences with these technologies. The authors discuss the analogue and digital characteristics as well as the freedoms and constraints relative to sites of learning, activities, learner configurations, and representations of learning. A postdigital analysis benefits from 'shifting work'; that is, much can be learned from shifting between analogue and digital. Such shifting may surface failures, depletion of resources, and the emergence of new entities. The value of examining the digital, analogue, ontology, and epistemology of AR and VR is that it helps to make the human-technology relationship more perceptible. In becoming more aware of the taken-for-granted aspects of learning technologies, it is possible to more effectively design for learning.

Keywords

Augmented reality, virtual reality, postdigital, networked learning, analogue, digital

Introduction

There is little if any writing published on augmented reality (AR) and virtual reality (VR) in networked learning (NL). This may be the case because these technologies are often used by individuals in isolation or in face-to-face, classroom settings. Multiple individuals can gather within a VR environment; however, each needs to wear a headset and wield one or two hand-controller devices. AR, on the other hand, often involves the use of a hand-held device that will allow images, text, video, or audio to be displayed when the camera detects a "trigger" image. Although learners can gather around a hand-held device to experience AR together, it is difficult to collaborate in an AR environment by distance. In this paper we explore the characteristics of AR and VR from a postdigital perspective. To begin, we offer two vignettes written to establish an atmosphere and provide shared AR and VR contexts. Next, we outline our understanding of NL and the postdigital approach. Within a postdigital lens, we then discuss how AR and VR technologies manifest analogue and digital features. As postdigital phenomena, we shift to an examination of freedoms and constraints with regard to the ontological and epistemological characteristics of these technologies. Finally, we raise some considerations for designing learning experiences that integrate AR and VR tools. Our analysis intended to stimulate critical thought about pedagogical applications for AR and VR in networked learning environments. A postdigital analysis can provide valuable insights into human-

technology-environmental entanglements and surface hidden features and implications of these technologies. Such analysis is an important first step before attempting to integrate these technologies within networked learning environments.

Vignettes

Before engaging in our postdigital analysis, we offer two vignettes. The first vignette describes a VR application (app); the second proposes an adaptation of the application for AR. In both cases, the goals include learning the names of Indigenous constellations and building sensitivity to Indigenous worldviews.

Vignette 1 (VR)

Sprockety[5], a small upstart company operating out of a small office in the research park near the University of [withheld for review], developed a beautiful Indigenous storytelling VR app:

> *Once the learners are outfitted with headsets and hand controllers, the immersive VR experience begins. There is a canoe accompanied by the sound of a gentle breeze and waves crashing against the shore. As the learners gingerly step into the canoe and sit down, the stars appear in the twilight sky. Turning their heads, the learners can look all around towards the horizons. To the left is the nearest shoreline. To the right, the water reaches beyond the horizon. Having had some time to familiarize themselves with the virtual topography and the feel of the controllers, a light appears in the surrounding water. The canoe suddenly lists as the pair of learners lean over almost simultaneously to gaze into the water. They squeal with a mix of delight and disbelief while coordinating their actions to right the watercraft before carefully peering into the water again. "You lean over the right and I'll lean over the left," one says to the other. While the learners are trying to discern what is in the water below, a spirit appears in the form of an old man, an Elder. The man begins to speak. His gentle, wise voice mixes almost melodically with the sounds of the water. He begins to describe the constellations. He provides their Indigenous names and recounts stories of their origins.*

Vignette 2 (AR)

Although there is no canoe to tip over, an AR app can also teach learners about the constellations through storytelling:

> *The learners turn on their smartphones and navigate to the constellation app. After the app opens, it geolocates the phone using global positioning information. The app accesses date and time information to ensure correspondence to the correct season—after all, different stars are visible in different locations depending on the time of year. At the same time, it uses directional information and the accelerometer, so it can provide instructions to each learner such as telling them to turn left or right and up or down. Once the app is fully operational, the learners can hold their devices up to the sky. Viewing the night sky through the camera, the app guides them in locating the North Star, Venus, and other key astronomical bodies—each time asking the learners to tap the screen when located. This process of triangulation helps the app overlay the constellation map accurately. The learners move as directed by the smartphone to locate the first constellation. As each learner reaches a particular location on the constellation map, it triggers the display of a video of an Elder who recounts the name and story of the constellation. Once the video finishes playing, the learners shift their smartphones scanning for another trigger point. Each time they shift and reach a different constellation, they trigger a new video.*

The two vignettes offer similar learning content and learning goals; however, the use of the two technologies shapes a different learning space and mindset. As Pischetola and Dirckinck-Holmfeld (in Gourlay et al., 2021) write, technology is not neutral but "embedded with values [and it is important to] explore how interactions with technologies entail a different quality of value, material texture, information, aesthetics, conviviality, and environment to which we couple our bodies and brains in a relational designed NL practice" (p. 338).

[5] Sprockety is no longer in operations and their VR application is currently inaccessible. We have taken some creative liberties with the vignettes in order to highlight potential aspects of VR and AR experiences.

Networked learning and the postdigital

Last year, the Networked Learning Editorial Collective (NLEC, 2020) invited a redefinition of NL. Their article reviews the historical bases and early definitions arriving at the description of NL as "involving processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (p. 319). In reconsidering the definition, the NLEC recognize the dangers of binary conceptions of information and communications technologies—a recognition they attribute to the "postdigital lens" (p. 318).

Having emerged from the field of art, music, and aesthetics (Andrews, 2000; Cascone, 2000; Metzinger, 2018), the postdigital refers to a philosophical perspective in which the 'digital' is so ubiquitous, it is passé; it has already happened (Cascone, 2000; Cramer, 2015). Through its pervasiveness, it becomes commonplace hardly drawing attention; it escapes the critical gaze. There is a not-so-subtle danger in its invisibility: "we risk the agency of machines (programmed through neoliberal values) creating the platforms by which we exist" (Jandrić & Hayes, 2020, p. 293). The postdigital lens helps us view the world as something in which the virtual is no longer separate from human-social existence (Jandrić et al., 2018). Previous dichotomies of are no longer viable conceptualizations of the world. From a postdigital perspective, the world is a *blend* of dichotomies such as old and new, digital and analogue, virtual and physical. The world shifts easily between these dichotomies or manifests such characteristics concurrently (a *multiplistic* view). What was considered 'old' technologies can be repurposed and reconceptualized. Technology, once considered 'other', is an inherent part of the human lifeworld and co-creates experience. The realization that the digital is but an imperfect representation of reality re-establishes the value of and openness to that which is analogue. For those wishing to design learning experiences in networked environments, the postdigital conceptions of analogue and digital ask designers to think more deeply about 'shifting' between them and what pedagogical benefits can emerge.

Analogue and digital

A common misconception is that computers and electronics are digital. Etymologically, the word 'digital' referred to the digits on one's hand: fingers. Fingers can be counted because they are discretely identifiable objects. According to the Oxford English Dictionary (2010), digital came to refer to "signals or information represented by discrete values of a physical quantity such as voltage". A clock that displays the time using discrete numbers is an example of a digital technology. Analogue, on the other hand, refers to phenomena characterized by continuous variability. A clock that displays time using hour- and minute-hands is analogue. The Oxford English Dictionary (2010) defines analogue as "relating to signals or information represented by a continuously variable physical quantity". There are both analogue computers, which process continuous data such as a thermometer or barometer (measuring temperature or atmospheric pressure changes in real-time correspondence to the physical phenomenon), and digital computers, which process discrete data such as 0s and 1s (*Analog Computer: Features, Examples and Its Comparison with Digital Computer*, 2021). Beaumier and Koole (in press) outline the ontological and epistemological characteristics of analogue and digital phenomena (Table 1).

	Ontology	Epistemology	Example
Digital	Perfect (seemingly) representation and/or reproduction of a world.	Observed through discrete values such as numbers, bits, pieces.	A digital clock display, binary code (1s and 0s), a mosaic of tiles or pointillism.
Analogue	Correspondence to physical phenomenon/a.	Observed through continuity, continuous variability.	An analogue clock display, a thermometer, a barometer, a naturalistic painting.

Table 1: Ontology and epistemology of analogue and digital (adapted from Beaumier and Koole, in press)

Admittedly, the analogue-digital dichotomy is, in itself, problematic because it is binary—unless it can be conceptualized as phenomena that can occur simultaneously or on a continuum. To this point, there are difficulties in categorizing current technologies. An electronic watch can be set to an analogue display or a digital display. The different displays can confer not only a different aesthetic, but differently nuanced information. For example, compared to a digital watch, an analogue watch provides additional visual information such as time ranges and can assist with quick, visual approximations of time. Ontologically, then, is an electronic watch digital, analogue, or both? Other phenomena such as light, depending on the apparatus used to view it, can appear as a particle or a wave. Ontologically, is light digital, analogue, or both?

The vignettes of the AR and VR applications described above help to illustrate and problematize the digital and analogue analogy. Both VR and AR exhibit digital and analogue characteristics. Both are reliant upon underlying computational processes involving digital code (1s and 0s). The VR vignette illustrates a representation of a world—albeit one that does not exist within the physical reality (i.e., without the aid of the headset and hand controllers). Aspects of the VR experience can be considered highly analogue because the sounds and visuals appear seamless and continuous to the learner. The AR application described above blends analogue and digital: viewing the night sky is highly analogue (continuous) while the triggered messages (whether video, audio, or text) may be considered digital components.

AR and VR from a postdigital perspective

In common parlance, 'virtual' is viewed as something that is not real or almost real. It is commonly associated with computer-generated worlds. However, Metzinger (2018) argues that virtual reality is much closer to our everyday consciousness than one might expect: "the conscious experience produced by biological nervous systems *is* a virtual model of the world—a dynamic simulation" (p. 3). Virtual and augmented reality devices are, after all, designed to work with our sensory-motor capabilities which are interpreted by the human brain. The brain is constantly interpreting sensory data and constructing representations of the world. Metzinger (2018) suggests that regardless of whether our perceptions are derived from a physical world or a computer-generated world, our brains strive towards an "integrated ontology" (p. 4). Although some VR applications might be highly realistic while others are more dream-like or hallucinatory, it can become difficult to ascertain the difference between real life and virtual experiences as users can develop a sense of presence and embodiment. It, therefore, should not be surprising that the learners in the VR vignette above panicked when they sensed the canoe tipping over.

Chalmers (2017) defines virtual reality as "an immersive, interactive, computer-generated environment" (p. 132). "Immersion describes the involvement of a user in a virtual environment during which his or her awareness of time and the real world often becomes disconnected, thus providing a sense of 'being' in the task environment instead" (Radianti, Majchrzak, Fromm, & Wohlgenannt, 2020, p. 2). Chalmers (2017) offers five categories of VR: *immersive, non-immersive, interactive, non-interactive* and *non-computer generated*. *Immersive* environments are characterized by three-dimensional spaces in which a user can explore through the sense of vision, hearing, and sometimes touch. Radiante et al. (2020) define immersion as "the degree to which a user can modify the VR environment in real-time" (p. 3). Radiante et al. (2020) argue that people will perceive the level of immersion differently depending on 1) individual perceptions of isolation from the physical world in relation to 2) the type and quality of technology used.

Controllers, keyboards, mice, head-and-body tracking tools permit interaction. Interaction requires tools to support perception such as visual displays, speakers, and headsets. *Non-immersive* environments are often two-dimensional worlds displayed on computer screens. They may be referred to as virtual worlds such as SecondLife (https://secondlife.com/). Greenwald (2021) suggests that AR is related to this non-immersive category. *Interactive* refers to a type of environment in which a user's actions can affect objects or features within an environment. *Non-interactive* environments include passive simulations such as watching a linear video. While the VR vignette describes a somewhat passive storytelling experience, the sensory tools such as headsets, speakers, and visual displays are still necessary to experience the simulation; therefore, there is still some interaction in the canoe vignette. *Non-computer generated* refers to camera-generated environments. Metzinger (2018) writes that AR "adds an environmental layer that is invisible for others, superimposing a new and additional set of priors onto the conscious subject's model of reality" (p. 14).

Beaumier and Koole (in press) provide additional insights into the ontological and epistemological nature of AR and VR (Table 2) with regard to freedom and constraints in experience and learning with these technologies. While the VR experience in the vignette is ultimately constrained by the underlying programming (software) and the need for a headset and handset (hardware), perceptually it offers potentially unlimited freedom to explore within a world from multiple angles, inside and outside. The learner may defy normal physical limitations because space is virtual. AR, meanwhile, remains much more tethered to the physical world; objects on screen may appear to defy laws of physics, but the human learner remains bound by them. For these reasons, the two technologies may be viewed on a continuum between freedom and constraint. Other non-immersive, virtual worlds also fit on this continuum. For example, in SecondLife, the user remains bound by physical laws, but their 2D avatar does not.

	Ontological characteristics	Epistemological Characteristics
VR	Activities occur within digitally rendered environments. *Freedom* to alter the environment. (Example: the user can fly.) Space and locale are virtual.	Virtual features can be superimposed and added to the environment. *Freedom* to alter perception of the environment (neither tethered to a physical environment nor laws of physics).
AR	Activities overlaid upon and *constrained* by physical environments and objects. (Example: the user cannot fly; avatars can.) Physical space and locale play an important role (Klopfer & Squire, 2008).	Virtual features can be superimposed upon the physical. Freedom to alter one's perception of the screen environment (yet experience remains tethered to a physical environment).

Table 2: Ontological and epistemological characteristics of AR and VR (modified from Beaumier and Koole, in press)

In re-examining the VR and AR vignettes at the beginning of this paper, there are certain freedom and constraints associated with each that render one more conducive to NL than the other. In VR, learners may participate together even though they are physically separated from each other. It is possible, for example, that with the right equipment, two learners from different geographic locations can sit in the VR canoe together and experience the learning activity. Co-experiencing a phenomenon can increase the learners' sense of co-presence. *Presence* within the context of VR may be defined as "the subjective experience of being in one place or environment, even when one is physically situated in another" (Witmer & Singer, 1998, p. 225). AR, however, is tightly connected to the physical environment. Learners from different continents will see a different configuration of constellations at a given time. Furthermore, when it is night-time for one learner, it might be afternoon for another. Therefore, collaboration between physically remote learners will require additional strategies; however, experiencing the same AR activity at the same time is difficult and the sense of co-presence will be differently nuanced.

Design for learning

Understanding analogue and digital characteristics of technologies as well as the freedoms and constraints of such technologies can inform practitioners about learning environments and help designing for learning. It is helpful to consider the sites of learning, activities, configurations of learning groups, and representation of learning (Table 3).

Sites of learning

The spatial-temporal location in which individuals engage can impact how learning is experienced qualitatively. In comparing the VR and AR vignettes above, the learners in each case likely experience a different sense of embodiment and presence. In one case, the learners sense being seated in a canoe as the sights and sounds surround them; in the other, the learners are standing, looking up at the stars and following the directions in coordination with their smartphones. The VR app creates a sense of precariousness because the learners' movements can overturn the canoe with any sudden movements. The AR app, on the other hand, allows the learner to remain firmly standing on the ground fully aware of both the 'real' physical world around them and the screen space. The VR experience can be shared simultaneously by two people who might be separated by great physical distance. The learners using the AR app might coordinate their experience by telephone or physical co-presence.

In both vignettes, the learning experience is co-created by the people, technologies, and networks. By understanding the constraints and freedoms of different configurations of these elements, instructors can think about how they wish to orchestrate collaboration and sharing. Learners may be asked to broadcast their activities to other individuals synchronously or asynchronously. Learners from disparate physical locations may be asked to gather into one virtual site. Many of these decisions are related to the learning goals and technologies accessible to the learners.

Activities

In both vignettes, the learning goal is to gain a better understanding of the culture's worldview through knowledge of cosmology. The VR app was designed to immerse the learner into a different world and, thereby, foster and openness to new ideas and sensitivities. The app offers a somewhat passive experience in which the learner acquires knowledge by listening to stories along with some ability to choose which stories are narrated and when.

Although the AR app has the same goal, there is less of an immersive experience. Once the AR app teaches the learner how to navigate and trigger narratives, the learner has greater control over which stories are triggered.

When using particular technologies, analysis of the technologies can become an additional learning goal. For example, learners can be asked to analyse the analogue and digital characteristics of the activities to create greater awareness of how they are engaging with each other, the environment, and the technology. Learners can be asked to analyse the applications with regard to social justice and environmental impacts. By reflecting upon their use and struggles with the technology, discussions may reveal that the technology is too costly for many people because it requires specialized equipment and a computer with great processing power. VR also requires a large amount of space in order for learners to move freely. Some learners might be prone to dizziness from the visual equipment. Availability of VR and AR apps in language other than English can be challenging. In addition, learners may wish to investigate the use of energy and resources in the production and use of electronic technologies. Similarly, for the AR app, learners might also discuss cost, the need for higher quality personal devices with sufficient capacity to fully operate the application. In other words, are these technologies inclusive for learners of all socio-economic-cultural backgrounds?

Learner configurations

Instructors might also consider how learners can exploit technologies for collaboration, which is an important aspect of NL. They might find ways to organize learners into analogue (i.e., unified groups) or digital configurations (smaller groups or separate individuals). It is also important to consider constraints of learner configurations in terms of social, physical, and political rules; for example, a class may need to establish rules of netiquette and turn taking. Furthermore, how might organization of learning offer freedom for meaning-making, negotiation, and sharing? The instructor might then plan how and when these learner configurations and rules of interaction can shift and blend. Learners may be asked to shift between working with others and working individually. They can reflect upon the value of cooperation, collective action, and relationships in the learning process—all of which reflect key values in NL.

Representations of learning

In traditional, classroom-based learning and even many forms of online and blended learning, learners are often expected to demonstrate what they have learned through exams, essays, presentations, portfolios, and artefacts. An interesting possibility is to ask learners to consider creating digital and analogue representations—or blends thereof. For example, having access the VR or AR app as described in the vignettes, learners could be asked to depict what they have learned. They could choose analogue modalities such drawing. They could shift their drawings from analogue to digital by collecting drawings from multiple learners and creating a mosaic on a wall (physical or virtual) or a video mosaic in which each drawing is presented along with narration. Learners may be asked to reflect upon how they experience the digital, analogue, and blended representations differently, which representations appeal to them, which representations they feel will help them remember the constellations or the better understand the culture's worldview. And, finally, learners can consider how their representations can become depleted through repeated use (such as when a .jpg image is repeatedly resampled and resaved, losing information each time.) Cascone (2000) argues that it is important to consider "concepts such as 'detritus,' 'by-product,' and 'background'. . . when visual artists first shifted their focus from foreground to background (for instance, from portraiture to landscape painting), it helped to expand their perceptual boundaries, enabling them to capture the background's enigmatic character" (p.13). When technologies fail, perform in unexpected ways, or co-create unusual experiences, that which is normally imperceptible or unnoteworthy is raised to awareness.

	Analogue / Digital	Freedoms/constraints	Shifting
Sites of learning	What are the qualitatively similar or different nuances of 1) different sites of learning networked together (a mosaic of site) vs. 2) individuals converging into one virtual learning space.	What might constrain these convergences? How might these convergences expand freedoms?	Learners may be asked to broadcast their activities to other individuals synchronously or asynchronously. Learners from disparate physical locations may be asked to converge into one virtual site.
Activities	Which aspects of the activity are analogue/digital?	What are the goals that guide the activity?	Critical analysis as a learning objective/goal: Learner can be asked to analyse the analogue digital characteristics of the activities to create greater awareness of how they are engaging with each other, the environment, and the technology.
Structure / organization	How might the class be organized in a way that is analogue (a unified group)? How might the class be organized to be digital (smaller groups or individual work)? How and when can the organization shift from one to the other?	What are the constraints within the structure of the learning organization? Are there social, physical, or political rules? How might organization of learning offer freedom for meaning-making, negotiation, and sharing?	Learners may be asked to shift between working with others and working individually. They can reflect upon the value of cooperation, collective action, and relationships in the learning process.
Representation of learning	What is a digital/analogue form(s) that conveys what the individual(s) has(ve) learned? Can the learners shift between analogue, digital, or both?	Does the nature, aesthetic, or experience of the activity change when shifting? Do those changes constrain how the learning activity can shift? What might constrain or free learners to create or share their representations?	Learners can be asked to shift between coding, decoding, recoding, repurposing, and reconfiguring representations. They may be asked to reflect upon how materials may become depleted with repeated use (lossy formats being repeatedly sampled down, paper breaking down, etc.) and/or how new forms emerge through shifting. What can be learned from failures or detritus?

Table 3: Designing for learning

Conclusion

Using a postdigital lens to explore teaching and learning technology, at first, may seem to be an esoteric endeavour. However, we argue that the value of examining the ontological and epistemological, digital and analogue characteristics of AR and VR is that it helps to make the human-technology relationship more perceptible. The above discussion of designing for learning offers various levels in which an analogue-digital metaphorical analysis can yield interesting and valuable questions and observations. One can examine how humans and non-humans are organized, ways to represent understanding, places and space for learning. In each case, one can ask if there is an analogue view or a digital view. One can reflect upon whether there is value to such views and for whom/what.

One can ask who or what is included or excluded as one shifts configurations. Knox (2019) writes, an "interpretation of the postdigital relates to a growing interest in surfacing the often-hidden material dimensions of the digital, such as the human labour required to produce and sustain technology, and the infrastructures and substances required to produce it" (p. 365). In a learning situation, whether face-to-face or networked, 'shifting work' can offer tangible benefits; that is, much can be learned from shifting between analogue and digital. Such shifting may surface failures, depletion of resources, and the emergence of new entities. Not only will an electronic photograph lose information and become blurry through repeated sampling and saving, so will a paper photograph as it is replicated repeatedly using a photocopier or pencil and paper tracing. What is important is noticing and questioning. Metaphorically, it is important to tip the canoe to see what sensitivities emerge.

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A purposeful design for transformative networked learning in an online doctoral programme

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Abstract

In recent years, there has been a growing effort within a research community of NL to re-define the notion of NL and re-configure the landscape of NL practice. The present authors, who are also members of the NL community, aim to contribute to such a collective effort by filling an existing gap in the ongoing conversation—the community has mainly focused on promoting and facilitating the "network" part of NL while assuming and neglecting the "learning" part. The article first argues that the ultimate purpose of NL is to create meaningful personal and social changes: transformative NL. Therefore, the emphasis of the transformative NL design should not be restricted to facilitating learner interactions and knowledge acquisition inside an online course but expanded to helping learners' holistic development that leads to meaningful changes in their lives outside the course. The article then proposes a "purposeful" design framework including three levels of interconnected NL communities that need to be considered when designing transformative NL: i) internal NL community in an online course that aims to transform individual students' perspectives through tutor-driven collaborative learning, ii) external NL community in students' real-life contexts that aims to transform group perspectives through student-driven collaborative practice, and iii) social NL community in broader contexts (or society as a community) that aims to transform social perspectives through community-driven collective action. The article also provides a brief illustration of purposeful NL design in an online doctoral programme in which the authors' teaching and research praxis is situated.

Keywords

Transformative networked learning, purposeful design framework, online doctoral education, perspective transformations, online learning environment

Introduction

This article proposes a purposeful design framework for transformative networked learning (NL), which will be illustrated in a specific educational context: an online doctoral programme. In recent years, there has been continuing effort within the research community of NL to search for a shared community identity by re-defining the notion of NL and re-configuring the landscape of NL practice (de Laat and Ryberg, 2018; Networked Learning Editorial Collective, 2020; Networked Learning Editorial Collective et al., 2021). The present article is also written to contribute to such a collective effort by filling an existing gap in the ongoing conversation and suggesting a useful conceptualisation of NL and its design. We (two authors of the papers who are also members of the NL community) perceive the NL community as a community of devoted teacher-researchers who believe in different aspects and benefits of NL and care about learners' effective learning and development (McConnell, 2006). Despite a diversity of pedagogical approaches that different members of the NL community may adopt in their teaching contexts, therefore, "design" is one of the core parts of our everyday practice, whether the design is directly translated into learners' course activities or indirectly infiltrated into learners' surrounding environments.

Nevertheless, NL design practices have usually limitedly focused on increasing learner-to-learner interactions (and a sense of community) within our immediately accessible and observable teaching space, such as online courses and programmes. As a result, the NL community has developed knowledge repositories with useful design principles and strategies for learner interactions and "networking". However, there has been a lack of comprehensive accounts of the outcomes of such interactions—more profound meanings and purposes of being

networked (also, not being networked). Even though learners' perceived benefits of social interactions in their online courses are frequently reported, it is still unclear what those benefits mean from a learning perspective and how those interactions have changed learners' lives in a more fundamental sense. In response to such relative absence, this article will argue that the NL community needs to focus on the ultimate "purpose" of NL and the meaningful "outcome" of being networked and networking from a "learning" and "design" perspective (not an assessment perspective).

Background and Problem

In 1998, the first definition of NL emerged as:

> ... learning in which information and communications technology (ICT) is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources. Some of the richest examples of networked learning involve interaction with on-line materials and with other people. But use of on-line materials is not a sufficient characteristic to define networked learning. (Goodyear et al., 1998, p. 2)

The NL theory continued to develop as early members of the community engaged with more practical design conversations on "what constitutes a useful design for NL" and "what issues need to be addressed in designing such courses." McConnell (2006) suggested a pedagogic framework for NL, including six principles as follows: i) *Openness in the educational process* where teaching and learning occurred are seen by participants in the learning communities, ii) *Self-determined learning* process where learners take primary responsibility for identifying and pursuing their own learning needs, iii) *A real purpose in the cooperative process* where a group of learners engage with learning relevant and meaningful to themselves interdependently, iv) *A supportive learning environment* where learners encourage and facilitate each other's learning efforts, v) *Collaborative assessment of learning* that involves self-peer-tutor assessment processes followed by reflections on such experiences as well, and vi) *Assessment and evaluation of the ongoing learning process* where tutor and learner continuously and collaboratively discuss and improve the design of the course. These six principles have been used to develop and improve a range of educational programmes (McConnell et al., 2012; Hodgson and McConnell, 2019).

More recently, however, there have been critical voices within the NL community that the community has much more focused on the educational phenomenon of being "networked" (and the technological affordances for connecting multiple actors and artefacts) than "learning" (and the pedagogical outcome of such networking) (see Oztok, 2022). As the NL community grew and the NL theory was more widely adopted by a broader group of educational practitioners and researchers along with other social learning theories, the benefits of networking for learning became more commonly accepted. Subsequently, it has become a taken-for-granted assumption that learning happens if learners are networked and networking. Learner interactions observed in online courses have been treated as clear evidence or manifestation of NL. There has been a strong thread of research conversations on how learners interact and how to facilitate learner interactions (and technological affordances that facilitate learner interactions) in different educational contexts. Consequently, much of the design efforts have been geared towards increasing learner-to-learner interactions and building learning communities within specific course environments.

While some NL researchers have focused on building learning communities in formal educational contexts using the NL principles, others have looked more closely into learning communities in informal educational contexts—for example, massive open online courses (MOOCs in Koutropoulos and Koseoglu, 2018) and social networking sites (Cloudworks in Alevizou et al., 2012). They have investigated the formation of informal learning communities, arguably enabled by communication technology, and the nature of participant interactions in those communities, largely mediated by communication technology. The NL theory (and principles) has also been used to analyse and evaluate different social learning practices that emerged in those informal learning communities. Some of the technology-mediated social learning phenomena, which were neither designed nor planned by NL researchers, have been retrospectively analysed using NL theory and conceptualised as NL practices. Many studies have reported that one or more of the six NL principles are realised in thriving learning communities despite the serendipitous nature of their development. Like the others who studied formal educational settings, these NL researchers also focus on participant interactions and socialising behaviours in those communities as evidence for NL. In this context, more recently, the term "community" has become a central theme in NL research(Hodgson and McConnell, 2018), and the multidimensional concept of being networked has been reduced to learners being connected to other learners.

Such an unbalanced research approach that focuses on the "network" part of NL while assuming and neglecting the "learning" part has limited the advancement of knowledge and practice in the NL community. To foreground the learning part in our conversations, we suggest that the NL community needs to move out of our comfort zone and challenge our pedagogical beliefs—with which we have become familiarised for the past decades—such that learner interactions and satisfaction are the evidence of meaningful social learning. This wake-up call can be particularly challenging since it also requires us to rethink some of the established NL principles, including the meanings of self-determined learners and the roles of learners and teachers in NL processes. The roles of teachers in NL need to be developing a deeper meaning of learning in their pedagogical context and guiding learners throughout learning processes to personalise and realise the meaning. Alongside the valuable attempts to re-define NL and re-configure the boundaries of NL practices, therefore, the NL community needs to engage more with design conversations (Carvalho & Goodyear, 2014). The emphasis of the NL design should not be restricted to facilitating learner interactions and specific knowledge acquisition inside a course but expanded to helping learners' holistic development that leads to meaningful changes in their lives outside the course. Below, we propose a "purposeful" design framework for "transformative" NL.

An Online Doctoral Programme

Before presenting our purposeful design framework, it is necessary to situate this conversation in our specific pedagogical context: a PhD in E-Research and Technology Enhanced Learning offered by the Department of Educational Research at Lancaster University in the UK. The programme is one of the first UK online doctoral programmes with taught elements (McConnell et al., 2012). During the first two years of the programme (Part 1), students as a cohort of around 30 start the programme at the same time and take six online modules together as a cohort in the same order. A lead tutor convening each of the six modules supervise the cohort's Part 1 learning progress. Students are all experienced educators in diverse educational and cultural settings. Approximately half of the cohort join the programme from outside the UK. Part 1 also offers two annual residential meetings during which members of the cohort visit the university campus in Lancaster, meet each other, and participate in face-to-face research training sessions for a week (the description reflects the situation before the COVID-19 pandemic).

Part 2 begins with each student submitting a research proposal (i.e., confirmation document) and seeking the institutional approval of their research ideas and plans. Each student is allocated one of the tutors as a thesis supervisor based on the chosen research topic and methodological approach. Once the proposal is approved, students conduct an independent thesis project with academic support from their thesis supervisor. Most students complete Part 2 and thus obtain a PhD in two to four years. Except for the two residentials organised during the first two years, students study fully online at a distance from the university and each other. The programme was initially designed based on the six principles of NL. Even though most of the original tutor team have left, and new tutors have joined the programme (including the two authors of the present article), and even as different aspects of the programme have been changed and re-designed over time, the NL ethos in the programme has remained strong. For example, the cohort-based structure provides a supportive learning environment where students encourage and help each other. There are multiple communication channels between students and the programme tutor team to discuss how to improve the programme design and student learning experiences. Each module also involves a collaborative (self-peer-tutor) assessment process and individual reflections on the process.

Since we joined the programme (each in 2013 and 2015), we have taught different modules in Part 1 and supervised more than a dozen students in Part 2 to the completion. We have continued to change the design of individual modules and evaluate the effectiveness of those changes through researching how those changes impact and improve student experiences (Lee, 2019; 2020a; 2020b; 2021). With other tutor team members, we have had ongoing conversations on the design of the programme as a whole and made a range of improvements to address and better reflect student feedback and suggestions. The idea in this paper is developed based on our multi-year collaborative teaching and research effort in the particular educational context. In the following section, we will first discuss the idea of transformative NL and move on to the purposeful design framework for transformative NL.

Transformative Networked Learning (NL)

The NL theory (and its design principles) strongly emphasises the self-determined learning process where learners (not teachers) take primary responsibility for identifying and pursuing their own learning needs. Previously, we have also pointed out the limitations with some authoritarian design approaches to determining and imposing

"good" (or "best") learning behaviours and outcomes without fully considering and understanding individual learners' circumstances and learning needs (Lee, 2018a). Thus, we fully appreciate the challenging (if not impossible) nature of pre-determining specific learning processes and outcomes before learners join online programmes. The challenge is even greater in adult learning contexts like our online PhD programme, in which learners are part-time students whose personal and professional lives are situated in different cultural and social settings from each others' and tutors'. Students' immediate goals for participating in the PhD programme vary, and subsequently, the knowledge and skills they wish to acquire are diverse (Lee, 2020a). Therefore, we have found it difficult to answer epistemological questions about learning such as "what knowledge should we teach in this course?" or "is there something students must know at the end of the course?". However, it is still necessary (and possible) to pre-determine the learning purpose in an ontological and axiological sense by asking "what is worth feeling, thinking, and experiencing during the course period?" or "what kinds of person do we want our students to be and become at the end of the course?" (2020b).

Going back to the origin of the NL theory, we can find strong influences of two different theoretical approaches to adult learning: transformative learning theory and critical pedagogy (McConnell et al., 2012; Networked Learning Editorial Collective, 2020). Both learning theories suggest that the ultimate purpose of adult learning is to make meaningful changes in learners' perspectives and practices (or praxis). In such transformative learning scenarios, the role of adult educators is to provide learners with opportunities to be exposed to new perspectives, re-examine and challenge their own, and plan different actions in their real-life working situations (Mezirow, 1997; 2000). It is essential that adult learners interact with other learners and teachers who have different perspectives as well as feel safe and encouraged to share their perspectives with others. Therefore, the focus of learner interactions is not about exchanging useful knowledge and similar opinions (so, reinforcing each others' perspectives) but about creating meaningful conflicts and having open dialogues to resolve the conflicts (so, transforming each others' perspectives and co-developing a new perspective). Furthermore, these dialogues should lead to planning and making real-life changes (so, transforming group practice in real-life contexts). For critical pedagogues, the aim of learner interactions is even more political—raising learners' critical awareness of unequal and oppressive social structures producing a range of struggles in their lives (so, enabling learners to undertake collective actions to make positive social changes) (Freire, 1970; McLaren & Jandrić, 2015).

Drawn from the adult learning theories, we argue that effective NL begins with a strong sense of learning "purpose" and outcomes, including individual perspective transformations, group practice transformations, social changes. In this view, the core outcome of being networked in an online course needs to be learners' ontological and axiological development through being exposed to and interacting with diverse perspectives. Learner interactions, therefore, should support and guide these processes of personal transformation and subsequent group and social changes (rather than knowledge construction and skill development, which is often a prerequisite for such transformations, however). Whereas individual learners take primary responsibility for their engagements with the course activities and specific changes made in their personal lives, teachers should determine the direction of students' learning processes and outcomes. We call it transformative NL. The focused outcomes of transformative NL in our online PhD programme, for example, are "becoming" critical scholars who are fully aware of social and educational inequalities in the society, ethical researchers who are deeply concerned about the political nature of scientific knowledge and its production, and critical pedagogues who are actively engaged with social changes and movements. Such tutor-(or programme-)determined purpose of doctoral education is at the heart of our NL design practice.

A Purposeful Design for Transformative NL

The question is then what to design to ensure the tutor-determined purpose of NL is achieved in the doctoral programme. There are two critical aspects of our purposeful design framework for transformative NL. Firstly, the framework re-defines the "scope" of the NL design. Our previous works (Lee, 2018b; 2021) argue that there is no clear separation between learning and living in the online doctoral education contexts. Students log into our online courses from where they have been and where they would continue to be; thus, learning does not occur in a vacuum. We need to understand that online learning happens in their pre-existing messy reality. Therefore, it is necessary to expand our conceptual boundaries of an online learning environment beyond our immediately accessible teaching space (i.e., a Moodle platform) to include each learner's everyday learning and living spaces. Of course, it is not to presumptuously insist that we need to access students' personal spaces and control their everyday practices, but to acknowledge that their learning experiences and outcomes are bound and shaped by their personal and professional circumstances and relationships.

The scope of our NL design goes beyond the formal learning space. Here, the concept of "community" can be helpful to better frame the scope. In the framing work, relative positions of communities (internal versus external) will be adopted from our (tutor's) vantage point. As historical beings, our doctoral students already have multiple memberships of different communities when they join the online PhD programme. They have lived, worked, and learned by participating and socialising in those communities, and their established memberships in those external communities outside the programme continue to be valid during their doctoral studies. They simultaneously exist in multiple communities in their life—they are more present in some communities and less in others. A cohort community newly built in the programme will be another one (not the only one) they join and co-develop—some will be more present in the community and others less. Although we feel the urgency to build a supportive community with a new cohort of thirty adults (given the short course period typically lasting between 3 to 6 months), it takes time and effort to have a genuine sense of community among the cohort. Thus, the expanded conceptualisation of the online learning environment that includes and utilises the existing communities outside the course space can provide an effective (even more efficient) approach to the NL design.

The second aspect of the purposeful design framework is the "purpose" of the NL design, which was primarily discussed in the previous section: enabling personal, group, and social transformations. Although we succeeded in having the cohort community built within a specific online course, the internal NL community itself does not necessarily provide learners with opportunities to make changes in real-life contexts. When our design aims to transform learner perspectives that ultimately lead to positive social changes, we cannot simply focus on what is happening in front of us on our Moodle site. Thus, the design efforts restricted to learner-to-learner interactions within the online course are insufficient. Although students experienced meaningful perspective transformations and developed effective action plans to transform their social practices, it may be too ambitious to expect each student to successfully manage those changes alone outside the course (Moffitt and Bligh, in press). Especially when the planned changes are rather radical, as critical pedagogues would envision, students are likely to experience resistance from other members of their external communities relevant to the changes. When some students (maybe a small number of students who actually enact new perspectives in their work environment) face such difficulties, they would genuinely need a supportive community. Given that most learning communities developed within formal online courses do not sustain after the course period when carefully designed and facilitated collaborative learning activities are no longer available, it is necessary to think about the role of the courses in developing and strengthening the external communities that exist and more likely sustain in learners' life.

Figure 1 is a visual illustration of the expanded boundaries of an online learning environment. The scope of the purposeful design framework for transformative NL embraces the expanded boundaries (Lee, 2018b).

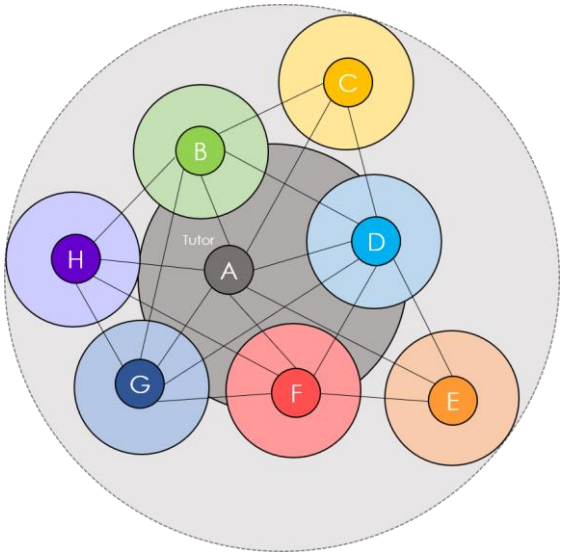

Figure 1. The Expanded Boundaries of Online Learning Environments: A Scope of the NL Design

The mid-size dark grey circle in the middle refers to an "internal" community emerging within an online course: a cohort community in our doctoral programme, for example. Circle A represents an academic tutor who designs and teaches the course. There are students (circle B to H) joining the course. Their engagement with the internal community vary. Some students (circle D and F) may more actively participate in the cohort community, playing central roles as core members even from the beginning of the course. Others (circle C, E, and H) are less likely to move towards the centre of the cohort community, remaining as outsiders even at the end of the course. From the students' perspective, the internal course community is new. Regardless of their engagement level, they are all newcomers in the cohort community for the time being—borrowing a notion of legitimate peripheral participation from a theory of community of practice (Wenger, 1998). On the other hand, they all have their own "external" communities outside the online course in which their everyday practice is centrally situated. Lighter coloured outer circles of each student (circle B to H) indicate their existence in those external communities as core members. Many online doctoral students, as experienced educators, tend to have a member identity of old-timers in their external communities, often exerting strong leadership. The large light grey circle with the dotted border indicates a bigger society potentially influenced by doctoral students' transformative NL outcomes through multiple changes made in their external communities: an envisioned scope of the purposeful design of transformative NL.

The original NL definition suggests the use of ICT to promote multiple connections "between one learner and other learners, between learners and tutors; between a learning community and its learning resources." (Goodyear et al., 1998, p. 2). However, as discussed above, those connections are not sufficient to achieve the purpose of transformative NL. When it comes to what to design, therefore, transformative NL designers not only focus on building an NL community inside their courses but also connect the internal NL community to learners' real-life contexts and the bigger society. Despite the inseparability between doctoral students' online learning and living, developing the authentic and organic connection between an internal NL community and learners' real-life context (and the bigger society) is not necessarily a simple task. Thus, the purposeful design framework suggests that we reduce the scope of learners' real-life context into one of the external communities to which their practice and planned changes are the most relevant. As Figure 2 suggests, there are three levels of NL communities whose developments and connections need to be carefully considered when designing transformative NL:

1. Internal NL community: a cohort community developed in an online course that aims to transform individual students' perspectives through tutor-driven collaborative learning.
2. External NL community: a professional community developed in students' real-life contexts that aims to transform group perspectives through student-driven collaborative practice.
3. Society as NL community: an informal NL community developed in a bigger society that aims to transform social perspectives through community-driven collective action.

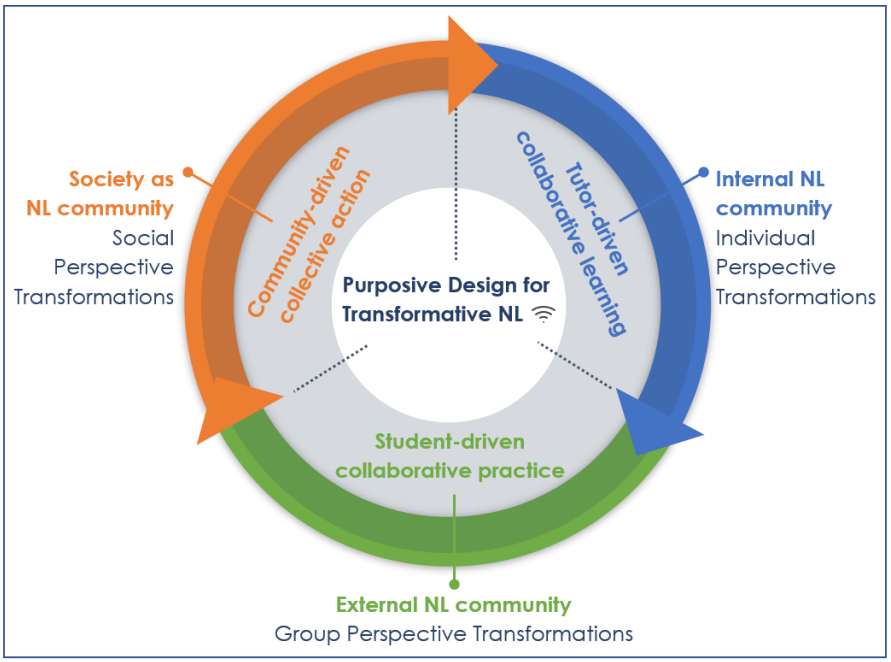

Figure 2. The Conceptual Framework for Transformative NL

Purposeful NL Design in Online Doctoral Education

The idea of promoting such "connections" between the single "internal" NL community and multiple "external" NL communities, in which each of the cohort members has individually participated, can still be rather too vague and abstract. To make the idea more concrete, we will present an illustrative example of the purposeful design based on our own experiences in the online PhD programme. Our main design effort goes into Part 1 in the programme, where we offer six online modules to the cohort. To begin with, we have carefully defined the idea of community to avoid mistakenly assuming a large volume of learner-to-learning interactions as the manifestation of a successful learning community. The structural characteristics that constitute a successful community of practice suggested by Wenger (1998) have enabled us to remain clearer and stricter to discern the development of a supportive learning community (details can be found in Lee, 2018b). This conceptualisation stresses the practice-oriented (rather than discourse-oriented) approach to community building. Each member needs to engage with a shared practice of the community, either collectively or individually. Online discussion groups that exchange ideas and opinions at a discursive level do not qualify as an NL community. This idea is also shared with students in the programme.

The internal NL community in our programme has research projects as shared practices—each module requires students to design and conduct a research project relevant to their professional practices and write a 4,000-6,000 research report. Many students experience a range of academic and emotional struggles, especially during the first part of the programme when they try to familiarise themselves with this new learning environment and research practices. The cohort community, including the module tutor, thus, provides both academic and social support. However, more importantly, as the programme aims to develop critical scholars, a series of collaborative learning activities are strategically planned to challenge some widespread assumptions about the educational use of technologies, provoke students' emotional responses to various educational problems, and increase critical thinking and research skills to address particular educational problems of their interest. The cohort community engages with the transformative learning process together as critical friends whose role is, in a nutshell, not only providing resources and encouragement but different perspectives and constructive feedback.

While students in the internal NL community develop the research foundation and engage with different perspectives, they select an external community where they would like to conduct their research project (see Figure 3). Tutor-driven learning activities in the internal community guide students in identifying specific research problems worthwhile both for the students and their external communities. Students bring the research foundations and different perspectives built through their engagement with the internal NL community into the external community and plan specific research projects to address the identified problems. Students are also encouraged to reflect on the ideas of research ethics and collaboration and further co-conduct their research project with other members of their external community—through which the community also develops into an NL community with a shared practice. The research outcomes drawn from the external NL are brought back to the internal NL community, where students theorise their them, develop new perspectives, which are brought back to the external NL community. Based on such "bringing back and forth" connection between the two communities, doctoral students achieve the purpose of doctoral education: becoming critical scholars and critical practitioners.

All aspects of the purposeful module design (including learner interactions) clearly focus on promoting the connections between internal and external NL communities. Despite the ultimate purpose of transformative NL, which is to transform social perspectives and make social changes, the scope of purposeful NL design is limited to the expanded boundaries of the online learning environment that include students' external NL communities. As previous NL researchers have observed the natural emergence of informal NL communities in society, we can envision the potentially transformative impact of the programme on the bigger society in which students and their external NL communities are situated. Nevertheless, transforming social perspectives (making social changes) requires community-driven collective actions beyond the design capacity of individual tutors or formal educational programmes.

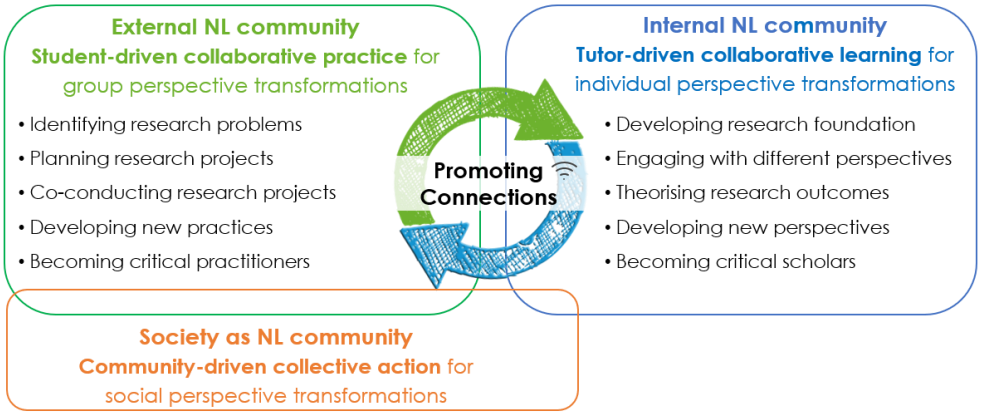

Figure 3. Transformative NL in Online Doctor Programme (a model adopted from Lee & Brett, 2015)

Conclusion

In 2020, Networked Learning Editorial Collective proposed a new definition of NL as follows:

> Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies. Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources and solutions, across time, space and media. (Networked Learning Editorial Collective, 2020, p. 320)

The new definition successfully expanded the scope of the NL process and highlighted a sense of the NL purpose as the terms "knowledgeable action", "shared challenge", "learning and action" suggest. Nevertheless, the community's response to the new definition clearly indicates a strong desire to integrate more critical perspectives in our NL definition and practices (Networked Learning Editorial Collective et al., 2021). It is important to remind us of the origin of the NL community, which emerged from a commitment to social justice and emancipation ideas. We believe what really distinguishes NL theory from other social learning theories is its political and critical orientation. Therefore, to strengthen our shared community identity, we must engage more with political conversations on the design of the NL and the roles of teachers in the NL processes. We hope that the conceptualisation of transformative NL and the purpose design framework provided in the article can usefully contribute to such conversations.

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Studying spaces in networked learning

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Abstract

As universities are making huge efforts on newly emerged learning spaces to accommodate the technologies involved in networked activities (Boys, 2014), it is important to know what students' practical preference of the study spaces on campus are. This paper found four types of study spaces on campus that international postgraduate researchers preferred, including university libraries, university postgraduate researchers' offices, student accommodations, and university cafés. However, due to the impact of COVID-19 pandemic, in the United Kingdom, higher educational institutions had to move almost all the learning activities online. This paper concerned international postgraduate researchers' learning experience during the lockdown in 2020 in the UK. At that time, many international postgraduate researchers often faced difficulties of lacking both learning resources and learning connections in the community and losing access to the study space they preferred previously on campus. This paper found students have different learning experiences during this period. While isolation brought negative impacts on some international postgraduate researchers' learning experience and connections with others in the community, others have not been influenced by it or even have benefited from it. These contrary learning experiences were mainly associated with students' different preferences for study spaces, ways of communication, and methods of having connections with others in the community on campus. Finally, the authors suggest that universities should change postgraduate students' offices and accommodations to enhance students' learning outcomes.

Keywords

Networked Learning, higher education, physical spaces, international postgraduate researchers, lockdown, learning experience

Introduction

Nowadays, learning situation is complex and it is hard to describe it as purely offline or online (Carvalho & Yeoman, 2018). With the rapid development of the interpenetration of digital and material, activities on campus are involved with digital tools and resources, which makes universities become hybrid and digital infrastructures (Goodyear, 2020). Therefore, it is common to see students bring networked digital devices in universities (Boys, 2014; Carvalho et al., 2016; Tylor, 2019). This phenomenon – networked learning – has been studied over the last twenty years, and it "promotes connections between people, between sites of learning and action, between ideas, resources and solutions, across time, space and media" (NLEC, 2021, p.319).

As technologies involved in networked activities become a mainstream on university campuses, educational architecture is changing to adapt to the prevalence of the networked digital devices on the campus (Boys, 2014; Carvalho et al., 2016; Tylor, 2019). From a micro perspective, it is also easier to provide more power stations for charging batteries. From a meso perspective, new types of learning spaces are emerging on campus, such as new learning commons, learning hubs and reconfigured libraries (Carvalho et al., 2016; Tylor, 2019). Students have a wide range of options to study. However, "among the many methods employed to foster student learning and development, the use of the physical environment is perhaps the least understood and the most neglected" (Strange & Banning, 2001, p.30).

A space is defined as "a phenomenon that is manifest between person, location and community interactions" (Wattchow & Brown, 2011, p.92). Relating to educational flexibility, space has always been seen as an obstacle that needs to be overcome to improve the access to learning opportunities. The growing use of mobile, personal,

connected technologies makes learning not restricted to specific spaces (Goodyear et al., 2014). Learning spaces were constituted in part by the devices that were taken from location to location, which were used to support study across time and space (Gourlay & Oliver, 2016). Studies find that the sense of learning being almost ubiquitous has paralleled how people use and experience space (Brooks, 2011; Gourlay & Oliver, 2016). Therefore, which spaces to study on university campus is an important question (Bligh & Crook, 2017; Temple, 2008).

Networked technologies (both institutionally provided and personal owned) not only bring students opportunities to study at times and space suited them, but also create a rich network of learning relationships (Goodyear, 2014). Timmis & Muhuro, 2019). Nowadays in higher education, the ability and opportunity to build relationships with the learning community is one of the most important responsibilities for students (Sihvonen, 2020). Furthermore, networked learning regards studying as a matter of engagement with others in a community (Oztok, 2019).

Networked learning includes both online and offline learning (Goodyear *et al*., 2004). However, under the massive pressure of the COVID-19 pandemic, higher education institutions have moved most teaching activities online (Peimani & Kamalipour, 2021). Under such circumstances, it is hard to stimulate students' learning experience and meet their expectations on higher education (Marinoni et al., 2020). And the situation can be more difficult for international postgraduate researchers who lack the physical support of their immediate families during lockdown, and their connection with others in the community on campus are mainly from networked learning, concluding both offline and online activities.

The isolation of international postgraduate researchers is problematic for at least three reasons. First, being isolated in one space makes students without access to learning spaces they otherwise used to study. Most students, including international postgraduate researchers, had to study online at home or even in rented accommodations, not only without access to the physical learning spaces they otherwise used to study, but also the decrease of the frequency of offline communication and socialisation with others. Thus, it is necessary to figure out when international postgraduate researchers were unable to access other physical spaces on campus during lockdown, how they connect with others in the community and what impact this situation has on their learning experience.

Second, the lack of communication and connection between learners can weaken the sense of community. Networked learning is a "learning in which information and communication technology is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources" (Goodyear et al., 2004, p.1). Previous research focusing on networked learning indicates that networked learning is "closely aligned with other sociocultural theories of learning including social constructivism, activity theory and actor-networked theory". An agreed opinion is that connection between community members is one of the components for networked learning occur (C. Jones, Ryber, & de Laat, 2015; Oztok, 2020, p.266).

To maintain and strengthen community cohesion, sense of community, pedagogical activities and socialisation are three main ways, and each of them are not opposite but complement each other (Oztok, 2020; Goodyear et al., 2004). Although spaces for formal education like university campuses are being extended with networked technologies, students who were isolated at accommodation without enough socialisation and connection with others will lack the learning activities that involves engagement and reaction in group-based work for a common goal (Boys, 2014; Oztok, 2020). Thus, the sense of community is decreased by isolation.

Third, a separation between a learning community and its learning resources can hinder the learning process or desired outcomes. Compared with other e-learning, networked learning thinks highly of the connection: interactions with others or online materials in isolation are not sufficient to constitute networked learning, as interaction should connect the learning community and its learning resources (Goodyear et al., 2004). Zhao and Kuh (2004) provide evidence of positive development in higher education when learning community experience was positively associated with student gains in personal and practical competence, social development, greater effort, and deeper engagement. Furthermore, there is a study indicating that students who have more communication and engagement with peers, academics and the institutions are likely to have a higher-level academic achievement compared with others who involved less at university (Krause, 2005). Therefore, how can we ensure that international postgraduate researchers are connected with each other, and that the learning community is functional when students are isolated from each other with minimal resources?

As universities are making huge efforts on newly emerged learning spaces to accommodate the technologies involved in networked activities (Boys, 2014), it is important to know what the international postgraduate

researchers' preference of learning spaces on campus are. As it can bring reference value to the design of educational architectures on campus, create a rich network of learning relationships for students on campus, and bring them valuable learning experience. Moreover, when international postgraduate researchers were isolation in the accommodation or rented house during lockdown, and unable to access other study spaces on campus they otherwise used to study; with the lack of communication and connection in the community; a separation between learning community and learning resource, what are influences on their learning experience and connections with others in the community on campus? *For convenience, the following students in this paper will refer to international postgraduate researchers.*

To clarify, based on the previous discussion, this study seeks to address the following questions:
1. What are the learning spaces that international postgraduate researchers prefer to study on campus?
2. How lockdown influenced international postgraduate researchers' learning experience and their connections with others in the community on campus?

Methods

To answer the research questions, purposive sampling was used in this study as it has the advantage of obtaining in-depth information through focusing on a relatively small number of instances deliberately selected on the basis of known attributions (Denscombe, 2017). The researchers invited potential participants in the social media who are interested in this study and selected eight full-time international postgraduate researchers (four male and four female postgraduate students) that meet the criterion.

The criterion is international postgraduate researchers who have already studied in the United Kingdom for at least one year, and still living in the United Kingdom during lockdown in 2020. Institutional ethical approval was granted for the data collection, with confidentiality and anonymity guaranteed participants, the project conforming to the ethical guidelines required by the British Educational Research Association (BBERA, 2011), and met the requirement of the UK Data Protection Act (1998).

In addition, semi-structured interviews have been conducted during the 2020 lockdowns in the United Kingdom. All the eight interviews were conducted through recorded voice calls and lasted from forty-five minutes to one hour. The transcription and translation work were finished later.

Category	Pseudonym	Details
Ph.D.	Lisa	F, 26 Chinese
Ph.D.	Dan	M, 29 Chinese
Ph.D.	Nate	M, 29 Chinese
Ph.D.	Francis	M, 28 Chinese
Ph.D.	Yumi	F, 28 Chinese
Ph.D.	Rain	M, 33 Korean
Ph.D.	June	F, 32 Saudi Arabia
Ph.D.	Louise	F, 27 Chinese

Table 1: Overview of the participants

For data analysing, this study used thematic analysis and followed Braun and Clarke's (2016) method of "identifying, analysing, and reporting patterns (themes) within the data". Specifically, inductive thematic analysis was adopted in this study, which aims to have a comprehensive understanding of the interview data and identify possible themes from the data themselves. Atlas.ti and Excel spreadsheet were used to analyse data, followed the six steps: becoming familiar with data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report (Braun & Clarks, 2016).

Findings

International postgraduate researchers' preference of learning spaces on campus

University campus is being carefully designed and aiming to bring benefits for learners to study anywhere and anytime and provide full flexibility for students (Boys, 2014). New learning spaces such as learning hubs, study zones, innovation of libraries and classrooms are emerging on campuses (Boys, 2014; Carvalho et al., 2016; Tylor, 2019). In UK higher education, the average cost of building and maintaining the learning space is expensive, and thus making the most effective use of learning spaces is important (Temple, 2008).

This study found students selected learning spaces on campus by looking for the environment or atmosphere that suits them, as these spaces could improve their learning experience and promote connection with others in the community. The reality of the international postgraduate researchers preferred to study on campus consists of university libraries, university postgraduate researchers' offices, student accommodations, and university café. Students were looking for two types of study spaces: private and non-private learning spaces. Although such classification seems very general and taken for granted, by reflecting the following detailed analysis of the reasons behind international postgraduate researchers' selection of studying spaces on campus, as well as exploring their learning experience and their connection with others in the community on campus during lockdown, which could help on finding problems they are facing in connecting with others in a community in those physical spaces students preferred to stay on campus. The preliminary suggestions will be discussed in the later of this paper.

For students prefer private or independent study space on campus, accommodation, and postgraduate students' offices (office has to be used by student individuals) were the two choices for them. Students found it is necessary and important to study independently. They can make use of the advantages of networked learning by studying in a private and individual space. Networked technologies helped them to have communication with others online easily and organise learning resources more effectively. When they have a feeling and a need for face-to-face conversation or socialisation with others, they could go out to socialise with others without carrying too many learning materials. In networked learning, the uses of mobile, personal, and connected technologies make learning not restricted to specific spaces (Goodyear et al., 2014).

For students who prefer non-private study spaces on campus, they have a wider range of spaces to choose from, such as libraries, postgraduate students' offices, and café. Specifically, students identified three study spaces that were providing different studying environments that they preferred. First, a university library is regarded as a formal learning space. Students used to study in that environment and surrounded by others to help them enter the state of learning, and they do not need to have any verbal communication with others. Second, cafes on campus were chosen because students needed the noises and people. Doing postgraduate research is lonely work and students reported that going to the university café can help students have connections with the city and university when they were studying abroad. Some of them went to the café due to the lack of connection or belongingness in the office and department. Such as one of the participants, June, feels isolated when they were studying alone on campus.

Third, the postgraduate students' office has multiple functions for students. It put students into daily routine for learning. When they are on the way to campus, they are preparing the mood for study. Although they are not sitting in front of the desk and learning but doing something else on the underground or have some activities they used to on the way to the office, their mind and consciousness are preparing to enter the state of learning, and once they arrive and sit on the desk, they are ready to study.

In addition, offices also provide a balance between their private and social time at the same time. It is the best space for students to study according to the interview. When students went to the office and sit on the chair in the office, they are urged to study. Although they also were relaxing or having entertainment in their office, it is just for a while, and they can be back to study again as other students and researchers were working in their office. Also, when participants passed through others' offices, they got motivation and could focus on studying again in a short time. Or, when participants were relaxing in the office, others may pass through their office. Although the door was closed, it still brought pressure on students and pushed them to focus on studying again.

International postgraduate researchers have contrasting experiences during lockdown

When students were isolated in the accommodations, they were unable to make use of other learning spaces on campus and nearly all the learning activities took place online. The separation between the learning community

and learning resources brings a huge impact on students' learning experience (Zhao & Kuh, 2004). Isolation brought a negative impact on some students' learning experience and connections with others in the community. Whereas others have not been influenced by it or even have benefited from it. These contrary learning experiences were mainly associated with students' different preferences for study spaces, ways of communication, and methods of having connection with others in the community on campus.

Positive experience

For students who had a positive learning experience during lockdown, they were used to the fully online learning environment and preferred to study in a private space. They could take advantage of networked technologies. Students like Francis thought online communication and socialisation is as effective as offline meetings. And the learning resources are easier to organise and to share with others in the online environment.

> During lockdown, having online meetings with my supervisor is a relief for me, I feel less stressed and more relaxed in talking through screen compared to face-to-face conversations. Also, the frequency of communication and quality of my studying have also improved.

Online learning activities involve group-based work with others for a common goal, and the sense of community is decreased by the isolation (Boys, 2014; Oztok, 2020). For instance, Louise expressed that:

> I do not think Covid-19 and lockdown affect me significantly. Instead, I enjoy this kind of situation because I can be alone. Online meetings with my supervisor and other people in my department bring me lots of benefits…I can have zoom meetings with my supervisor, use Google Drive documents to share documents, and work on a paper at the same time.

Specifically, according to the interview data, their learning experience were improved for the following reasons:

- accommodation provided them an independent learning environment that they preferred to study;
- networked technologies helped them save the commute time;
- communicate with others online across the screen gave them a sense of security and comfort compared to face-to-face conversations;
- online learning made them feel more efficient compared to traditional learning;
- the flexibility of online meetings.

Their connection with others were increased and the sense of community were also strengthened, because:

- they preferred to communicate online and thus they had communicated more with others online during lockdown compared to times before lockdown in the department building;
- online learning has the flexibility of time as well as the multiple ways of communication (video call, voice call and typing), which provide them a feeling of control of time and media;
- using software such as Google Driven documents brings them opportunities to be involved and engaged in group work for a project.

Negative experience

Students who had a negative experience during lockdown were not used to the fully online learning environment and preferred to study in a non-private space. Although networked technologies bring opportunities for learners to study anytime and anywhere that suit them (Goodyear, 2014), lockdowns made students lose access to the physical learning spaces they otherwise used to study, such as libraries, graduate student offices, and cafés. Students were used to studying at accommodations as they regarded accommodation as a private space. When asked their learning experience during lockdown, students like Yumi said:

> It is a disaster for me. My life is in chaos. Accommodation is a space for relaxing. I just cannot do anything else here, especially studying, […] I just need to go to the library or the office in my department building. I need real people not the one on the screen.

Meanwhile, building and maintaining connections with others only through an online environment did not suit them, as they prefer face to face communication and socialise with others on campus. Importantly, their learning largely relies on the connected learning community and learning resources (Goodyear et al., 2004). For example, students like Dan and Lisa emphasised the difficulties they were facing:

> When I was in the office, I can have conversations with others during the break time. I have learned a lot from my colleagues. […] they started doing research earlier than me and gave me lots of useful recommendations. (Dan)

> I felt good in the office before. I felt I had colleagues and friends in the department buildings. But when everything goes online, in most of the online meetings or the seminars or whatever, I doubt anyone can remember me, […] like I was in a programme with others for three months, but by the end of the programme, about half of them could not even remember my name. I feel sad. (Lisa)

What is more, according to the interview data, the possible reasons that students' learning experience decreased were:

- losing the physical learning spaces they used to study makes them lose their schedule and habit. It is hard for them to concentrate on studying for a long time and not being distracted;
- students need to separate different spaces and time for different activities. While previous transporting time and changing of physical space help students separate study time and relaxing time, stay at home blurs the line between studying and resting time, which then brought a negative impact on their learning experience;
- the quality of online meeting is worse than face to face meeting for these students because they felt both themselves and supervisors were easily being distracted, and students felt less active in the conversation and less engaging compared to offline meeting;
- online learning made them lose the opportunity of learning from others in the office, libraries, or other study spaces. Studying in the office can make them have a shared physical space to communicate with others, create a sense of belonging to the community, and motivate them to study.

Their connection with others were decreased and the sense of community were also weakened:

- as mentioned before, some students did not prefer an online environment. They had less communication and socialisation with others online compared to offline. And their sense of belongingness in the community decreased;
- online communication made students lose the shared atmosphere when they were in the same physical space. In the online environment, each of them was truly individuals and do not have a sense of being in a group;
- as an international student, despite having access to an online environment no matter where they are, they were often invisible in the online environment or as a minority group to some extent. Online learning weakened their connection with others;
- as students' connections with others largely relied on both online and offline social activities, the loss of the opportunity of face-to-face communication made them lose the shared physical buildings and atmosphere that is helpful to enhance the community experience and increase their feelings of belonging in the community.

Discussion and Conclusion

In summary, this study found that international postgraduate researchers' preference of study spaces on campus including university libraries, university postgraduate researchers' offices, student accommodations, and university café. Students presented that they chose the learning spaces on campus by looking for the environment or atmosphere that suits them. And a suitable learning environment could increase their learning quality and promote connection with others in the community. The authors found students were looking for two types of study spaces, namely private and non-private learning spaces. For students prefer private or independent study space on campus, accommodation, and postgraduate students' offices were often two optional spaces for them. For students who prefer non-private study spaces on campus, they have a wider range of choice that consists of libraries, postgraduate students' offices, and cafés.

Moreover, international postgraduate researchers have contrasting experience during lockdown. Students who have a positive experience during isolation because they accept the fully online learning environment and prefer to stay in a private space. They take advantage of the feature of networked technologies, that is, to bring students opportunities to study at times and spaces suited for them. Also, this study found that both the learning outcomes and connection with others in the community were increased. Because they have more frequent communications with others, and they can make best use of the resources online to improve their learning quality.

However, students who had a negative learning experience during lockdown because they were not used to a fully online learning environment and preferred to study in non-private study spaces. Without access to the study spaces they used to before lockdown, and thus their learning has been affected greatly. Students regarded accommodation as a private space, and they were not enjoying studying in accommodation. Meanwhile, building and maintaining connections with others only through an online environment also did not suit them, as they prefer face to face communication and socialise with others on campus.

Furthermore, universities are making huge efforts on newly emerged learning spaces to accommodate the technologies involved in networked activities (Boys, 2014). Surprisingly, this empirical study found that international postgraduate researchers still preferred to study in the most traditional and common spaces like libraries, accommodations, offices, and cafes. Based on the previous findings, the authors suggest ways to improve the study spaces that international postgraduate researchers prefer to stay in and enhance their learning experience and connection with others on campus. Specifically, the authors made the following suggestions for universities to be devoted to improving postgraduate students' offices and accommodations, which are used by many students as the main learning spaces but being ignored to some extent.

For postgraduate researchers' offices, the authors first suggest that universities can also change the current layout of the office to create both private and non-private study spaces for students. For instance, for those who enjoy the private learning space, universities can add room dividers to create some independent working space. Besides, students should have opportunities to select their office. Most postgraduate researchers were assigned to an office at the beginning of their study. They have not been given many options on the selection of offices that suit them. Therefore, students can be given opportunities to state their need for the office. Allowing students to choose whether they want to have an individual office, or an office shared with others.

For accommodation, which was preferred to use as learning space by some students. However, most of the accommodations do not pay much attention to the learning function for students. The design of the accommodations, such as the size of the room and learning equipment, are not enough for students who select accommodation as their main learning space on campus. Therefore, the authors suggest universities could make an effort on improving and innovating student accommodations, such as designing a new type of accommodation which expands the role of learning.

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The Mode 3 Networked University: A New Materialist Perspective

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Abstract

The idea of a modern university is a constantly changing and often contested concept. This paper traces the idea of a university using three modes. These modes are the Mode 1 Ivory Tower, Mode 2 Factory and Mode 3 Network. This framework draws upon higher education literature as well as three modes of knowledge production. I use these modes as a framework to describe the genealogical and historical development of the university in the Western world. These however are not purely historical and elements of their characteristics can be found within and between university institutions today. A genealogy shows a historical path dependency (i.e a teaching and research institution) of the idea of a university and a new materialism perspective shows the coming together of the many elements of the network assemblage which includes the discourse on the idea of a university clashing with new ideas, technologies and policy. The growth and development of the modern university from small, autonomous, elite and autonomous in mode 1 to large, mass regulated factory with marketplace outputs within neoliberal societies is well documented. The Mode 3 Network University is emerging with a potential for universal access with networked societies and technologies and has many actors influencing its becoming and idea. The 2020 Covid-19 pandemic and a broadening multidisciplinary approach to the field of Networked Learning has been called for and I introduce the possibility of theoretically analysing the becoming and enactment of the Mode 3 Network University using concepts and frameworks from the broad field of New Materialism. Such approaches take into account the complex assemblage and network of actors which are human and non-human in the growing and diversifying university. The growth and marketisation of the university has added to this complexity with commercial 'unbundling' taking place. Degrees, institutions and functions are being unbundled and rebundled and this active complex network of actors including technologies, humans (academics, students, employers, wider public) and the residual path dependency of the three modes are in tension and conflict but come together to enact the modern university. New Material methodologies allow for these many influences to come together in a 'flat ontology' to allow for a more nuanced and new approach to research in Networked Learning.

Keywords

New Materialism, networked learning, idea of a university, ivory tower, factory, network

Introduction

The field of Networked Learning has developed and evolved as new technologies and networks have been introduced into universities and other learning environments. Many years of research and development of the field and the global Covid-19 pandemic has pushed networked learning into greater prominence, culminating in the field taking stock of its work and inviting redefinition for the future (Networked Learning Editorial Collective (NLEC), 2020). The NLEC remind us that as we emerge from emergency remote teaching, and language moves towards 'blended', 'hybrid', 'online', 'offline' (to name but a few) there has been considerable focus on the network:

> There is a field of research and practice in education that studies such entanglements. It is known as networked learning. Over the last 20 years or so, researchers in this field have developed methods for analysing learning networks and designing for networked learning. (Networked Learning Editorial Collective (NLEC), 2020; p313).

In this paper I focus on such entanglements to theorise the contemporary and near future university as a networked assemblage of human and non-human actors. The broad field of New Materialism is an opportunity to trace complex assemblages, seeing universities as physical and digital sites of networked learning. I view this network as embedded into the fabric of society with traces and residual ideas and discourses of the idea of a university and what is developing and being sociotechnically imagined (Jasanoff & Kim, 2015; Matthews, 2021a). Here I propose theoretical opportunities for future research in the field.

As the we move out of pandemic into the brave new world of hybrid, blended, etc, it is important to see the path dependency or genealogy of the university as it enters a new digital and technologically driven future. In response to the call for a refresh and redefinition of Networked Learning as a field the NLEC (2021) take a socio-technical perspective which aims to not focus on just the technological but also the social. Examples include both a political and technological analysis of networks as well as the philosophical and sociological.

In this spirit I build on this work to explore New Materialist perspectives which look to acknowledge complex entanglements of technologies and the social. To do this I take a historical and path dependent framework with which to look at the development of universities using three modes as presented by Nørgård, Mor, & Bengtsen (2019) and expanded by Matthews (2021b). Modes 1, 2 and 3 trace the development of universities in societies with the autonomous Mode 1 University as Ivory Tower and Mode 2 as industrial and post-industrial neoliberal Factory. Mode 3 is the Network University developing what has come before as the autonomous researcher-teacher model in mode 1 develops into the growing factory with more roles with measured inputs and outputs. Each mode fits with Trow's (1973) elite (1), mass (2) and (potential) universal (3) access to university. Mode 3 is part of society and is networked socially and technologically where boundary walls are much more porous than the classic vision of the Ivory Tower university walled off from society.

The paper develops as follows. I genealogically trace the development of the Mode 3 University, noting that strands of history with ideas and discourses leave residual traces. This is followed by a look at the social and technological aspects of Mode 3, making links with the Unbundled University (Swinnerton, Ivancheva, Coop, Perrotta, & Morris, 2018). This is followed by a proposition for a new materialist approach to researching the networked university which embraces entanglements and becomings which attempt to trace the enactment and idea of a university in complex assemblages of actors both inside and outside of the university.

A genealogy of the Mode 3 Networked University

A key aspect of the Mode 3 Network university is the networked fashion of interests and influences. This is clear in the Unbundled University which adopts business practices of unbundling roles and tasks within the university as well as unbundling the 'product' for consumer value and convenience. This contrasts but also builds upon the genealogical development of the university in mode 1 and 2. The Mode 1 University as described by Nørgård, Mor, & Bengtsen (2019) sees universities as governed independently without any political or private interference. Academic freedom is at its most free in that research and teaching is based on enquiry and discovery. Research is termed as 'basic', 'pure' and mode 1, situated in disciplinary silos.

> Here, knowledge is universal and kept within the university walls in a self-sustaining ecosystem. The inhabitants of the ivory tower are the keepers of knowledge, and their task is to transfer knowledge from one generation to the next and from university to society. (Nørgård, Mor, & Bengtsen 2019; p72)

I further conceptualise the university in mode 1 as a product of the humanistic Enlightenment period whereby a university education emerged as a reaction to the dogmatic transfer of static knowledge, often associated with religious institutions, passed from one generation to the next. Key figures in articulating the Enlightenment ideals were Kant and Humboldt in Germany and Newman in England. Kant in writing his ***Conflict of the Faculties*** (Kant, 1992) as well as being one of the architects of the Enlightenment period with his call of 'Sapere Aude' (dare to know) challenged all citizens to use one's own understanding and enquiry. Humboldt is credited with 'bundling' (contrasting the unbundling in Mode 3) teaching and research and treating knowledge as not static, but learning in research mode with knowledge as a problem not fully resolved (Elton, 2005). Alongside Kant, Humboldt and other Enlightenment thinkers, Newman set out his vision of the university in ***The Idea of a University*** (Newman, 1852) which rejected the university as transmitting encyclopaedic knowledge from one generation to the next or for vocational skills but to develop the whole person in moral and intellectual habits. A charge directed at the writers

and enactors of the university in mode 1 was its elitist entry and small scale opportunity for all of society to engage with knowledge and education - the elite, closed off university (Trow, 1973).

Whilst Trow (1973) identified the small-scale elite access university (conceptualised here as mode 1) he also foresaw the move to a mass access university. Nørgård, Mor, & Bengtsen (2019) term the mass access university as 'the factory':

> In the mode 2 university, researchers and teachers find themselves in a situation where they have lost much of the ownership and the power of definition, which characterises the mode 1 university. The factory is not in control of its own fate, it is rather a question of market forces and demand, and here relevance and value are measured in the ability to efficiently produce a future workforce with competencies enabling employability as well as the production of socio-economic growth. (Nørgård, Mor, & Bengtsen 2019; p73)

Aspects of freedom to teach and research wherever enquiry took students and academics in the Mode 1 University began to be eroded when nation states and industry saw the knowledge producing university as a tool of socio-economic progress. Research and teaching remains a key characteristic of mode 2 (Tight, 2016) but as much more of an output in factory terms. The growth and mass interest in the Mode 1 University is testament to its success but it also coincided with the application of the science of the Enlightenment period emerging into industrial revolutions involving a concentration of Western populations on industrial towns and cities. Much of this involved work concentrated on factories which cannot have been a coincidence in Nørgård, Mor, & Bengtsen's naming of the Mode 2 Factory university. Economic growth and development in western countries was followed by a social and economic move to a neoliberal knowledge economy which again pushed the institution of the university to centre stage as knowledge producers and disseminators of that knowledge with the mode 2 factory university metaphorically having inputs and product outputs at the end of a production line (students and knowledge).

The idea of modes of production of knowledge in mode form has roots in the work of Gibbons (1994). The production of knowledge in mode 1 for Gibbons was set within the confines of disciplinary university structures (psychology, sociology, biology, chemistry etc). As described above in the elite Mode 1 University, knowledge was created and disseminated for its own sake and directed by academic interest and freedom to pursue knowledge. Mode 2 knowledge production for Gibbons is transdisciplinary aimed at solving real world issues in social and economic context.

Clark Kerr documents this development in his ***Uses of the University*** (Kerr, 2001) which in contrast to the writers on the Mode 1 university (Kant, Humboldt and Newman) describes the university institution as a 'Multiversity' in that there are many uses and purposes. Key to the development of the Mode 2 university is the societal development from industrial to post-industrial neoliberal knowledge economies. Kerr comments on the German (Kant and Humboldt) and UK (Newman) conceptualisations of the university entering the US in developing the university in mode 2.

> German intellectualism and American populism were merged in the new university. Pure intellect and raw pragmatism made an unlikely but successful alliance. (p36)

And the factory analogy continues with Kerr commenting upon the coming together of industry and academia:

> The university and segments of industry are becoming more alike. As the university becomes tied into the world of work, the professor – at least in the natural and some of the social sciences – takes on the characteristics of an entrepreneur. Industry, with its scientists and technicians, learns an uncomfortable bit about academic freedom and the handling of intellectual personnel. The two worlds are merging physically and psychologically. (p68)

Neoliberal approaches to education are well documented (Ball, 2008; Moore, 2004). A key aspect of neoliberal practice is measurable output of performance rather than professional experience and knowledge (Olssen & Peters, 2005), known widely in education as 'managerialism'. Elaborating on the factory analogy, the Mode 2 university is more open to society with mass access of students and governments and industries having more of a say in what is researched and taught through regulation and funding regimes. Key to this is that inputs and outputs became more open and universities in mode 2 respond to regulatory (government) and market (industry) need. The process of the factory production line is still closed off to much of society but the inputs and outputs are clearly defined

by markets and regulation in line with neoliberalism. The direction of knowledge, research and teaching as a one directional output is challenged in the Mode 3 Unbundled University.

The Mode 3 Networked Unbundled University

The Mode 3 Networked Unbundled University has not emerged independently, but is emerging from modes 1 and 2 described above. Seeing this development as genealogical embedded into the social conditions of its time allows us to see the Mode 3 Networked University, not as independent but building on and still showing signs of the residual and legacy ideas and developments of the university - this is key for new materialist approaches outlined below. Moreover, such a framework I hold can be used to identify approaches across time (history) and space (institutions, departments etc).

Basing mode 1 in the Enlightenment period with the emergence of the scientific method rejecting tradition and religion and mode 2 in industrial and post-industrial neoliberal knowledge economies, the new and emerging mode 3 university, I place in the social context of the Network Society. The Mode 3 Network is open in many more ways, not just to inputs and outputs but to the many aspects of contemporary universities. This is part of wider social change, including, mode 3 networked knowledge, networked society, the business practice of unbundling of roles carried out in the university and new technologies all building upon modes 1 and 2.

Key to my conceptualisation of the Mode 3 Networked University is the recent developments of Gibbons (1994) knowledge production. As described above, mode 1 knowledge production is set within disciplines with freedom for academic enquiry, while mode 2 is interdisciplinary and problem solving to the needs of the government and markets.

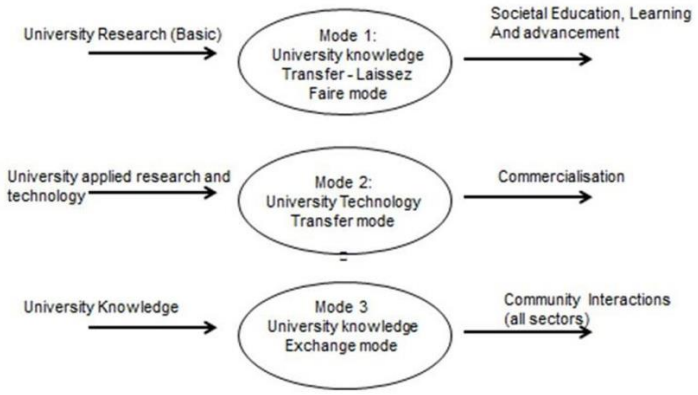

Figure 1. (Carayannis, Grigoroudis, Campbell, Meissner, & Stamati, 2018)

Carayannis et al in Figure 1 develop the modes of knowledge production concept further with mode 3 as knowledge exchange and production as multi-directional between all aspects of society. Moreover, the university in mode 3 does not have exclusivity on knowledge production (research) and dissemination (teaching and public engagement). Mode 3 knowledge production is not the one way dissemination of knowledge (from a university) but a many to many interaction of nodes including (amongst many others) industry, governments, academia and wider public (Carayannis & Campbell, 2012; Carayannis et al., 2018). Liyanage and Netswera sum this up as follows:

> In other words, Mode 1 is not adequate to solve social problems. As a result, Mode 2 and Mode 3 have evolved combining scientific knowledge and social contexts. It is a reflexive knowledge production system with reverse communication. Namely, science speaks to society, and society speaks back to science. (Liyanage & Netswera, 2021, p. 3)

Castells (2000) outlined the emerging Network Society. For Castells the development and access to new network technologies was just part of the social move toward a Network, as many nodes in the social network. The network for Castells dominates contemporary life, not just work and economics but all social life in the Information Age. These networks for Castells are open, global and connect diverse entities that would have previously been independent (universities in modes 1 and 2 for example). Examples for Castells include stock markets,

governments, television systems and the natural world making up a meta-network of capital where it is often unclear who the owners, producers and managers are. The university in mode 1 and 2 is singular and linear, in mode 3 it is networked both inwardly and outwardly.

An example of such two-way networking is the professional social media platform LinkedIn. Komljenovic (2019) outlines how the platform 'networks' with the university in that students (and faculty and professions) use the platform to record and advertise their experiences which link to jobs and other advertisements drawing upon student data owned by LinkedIn. Further, universities themselves use the LinkedIn platform to advertise but also track student employment destinations through dashboards and data. Such data collection provides analysis and links to jobs and learning courses (Matthews, 2016). This shows the networked power of such platforms as part of the Mode 3 Networked University transcending the boundaries and inner workings of the university - and thus having an influence upon the university and its idea and ontology.

The networking and boundary blurring of society and the university is evident in what has been termed the Unbundled University (McCowan, 2017; Swinnerton et al., 2018). Walji (2018) describes unbundling as:

> Unbundling is the process of disaggregating educational provision into its component parts likely for delivery by multiple stakeholders, often using digital approaches and which can result in rebundling.
>
> An example of unbundled educational provision could be a degree programme offered as individual standalone modules available for credit via an online platform, to be studied at the learners' pace, in any order, on a pay-per-module model, with academic content, tutoring and support being offered by the awarding university, other universities and a private company. (Walji, 2018)

Just as LinkedIn enters the university in a networked permeable fashion, mode 3 as depicted in Figure 1 sees a two-way, multidirectional and networked relationship between society and the university. This is an important area of study as the idea of a university develops and evolves. For some, unbundling has been happening since the beginnings of the contemporary university (mode 1 as the sole academic researching and teaching) and higher education's growth and success has seen specialist roles (careers, accommodation, management, estates etc) being required for large-scale institutions the size of the modern university (Gehrke & Kezar, 2015). The recent attention and growing literature on the unbundled university shows that the university in Mode 3 is enacted in many ways through many nodes including new technologies, private commercial interests and the residue (genealogy) of the university of the past (i.e research and teaching).

> Universities will need to guard against this disaggregation of education, and its unintended consequences, whilst remaining relevant and active in this space, which will continue to attract interest from a wide range of private providers, including employers and new training providers. (Morris, Ivancheva, Coop, Mogliacci, & Swinnerton, 2020, p. 15)

The mode 3 networked university boundary is becoming more porous to outside interest. The need for specialist skills also comes with commercial interest from private companies. Perrotta (2018) details the phenomena of the Online Programme Management (OPM) which goes further than design online resources as a service for universities but creates long term partnerships involving private commercial companies taking up aspects of the university operation. This includes many aspects of the university such asadmissions, marketing and technology to directly teaching students. Moreover, the very identity of a university as a teaching and researching institution is potentially being unbundled (Matthews and Kotzee, 2022).

The Mode 3 Network University is an important concept in considering the influences and co-existence of influences of actors in the unbundled university embedded within a network society. In fact, McCowan warns that the university in unbundled form could no longer exist as a university as borders become so permeable that they disappear. Writers such as Barnett (2018) see this development of the university as an open ecosystem with many influences and actors. Barnett's ecological university is defined as an ecosystem of ecosystems including: knowledge; social institutions (schools, universities, government etc); people; the economy; learning; culture and the natural environment. Ellis and Goodyear (2019) highlight some of the challenges and complexities of the ecological university and its governance strategies with so many actors bearing influence upon the ecosystem/network.

The mode 3 networked university cannot be theorised or researched from a technological or social perspective alone. Analysis of such complex relationships requires methodologies and perspectives which make connections between the growing number of (human and non-human) influences in the Mode 3 Unbundled University. What follows is a brief overview of the broad area of New Materialism which I propose as a way of understanding and researching such relationships which come together to enact the idea of a university in Mode 3.

New Materialism

The contemporary and future networked university is not governed by one person or group of people who have sole agency and power to direct and enact the idea of a university (see Mode 1 above). We may lay the effect of unbundling of university functions to specialist roles or private companies as a cause such as capitalism or neoliberalism. However, New Materialist perspectives 'flatten' such ontologies and grand narratives.

> There are no structures, no systems and no mechanisms at work in the new materialist ontology; instead there are 'events'; and an endless cascade of events compromising the material effects of both nature and culture that together produce the world and human history. Exploring the relational character of these events and their physical, biological and expressive composition becomes the means for sociology to explain the continuities, fluxes and 'becomings' that produce the world around us. (Fox & Alldred, 2017, p. 7)

New Materialism rejects binaries (such as agency and structure) in what is described as a 'flat' or 'monistic' ontology. Such a relational perspective fits the Mode 3 Networked University with its vast array of human and non-human actors which include (to name but a few) specialist roles in the university, employer and student expectations, commercial private interest, government and institutional policy, built physical and digital environments and the residual and genealogical legacy ideas of a university (see modes 1-2 above).

New materialism has an ontological orientation towards matter in that it is concerned with what it does and not what 'it is'. Such matter is post-anthropocentric in that it focuses on humans and non-humans as matter including thoughts, memories, desires as well as power and resistance to power. This ontology of new materialism is relational (Fox & Alldred, 2017).

As explored so far in this paper such an assemblage of relational actors include the different modes or 'ideas' of a university. Although, modes 1, 2 and 3 as outlined are broadly historical this does not mean that the university in mode 1 has totally been rejected. In some locations or parts of a university mode 1 may be clearly visible. In the same university, mode 2 may dominate perspectives and in others mode 3. There indeed may be a tension between all three which is in itself productive in the becoming and idea of a university as well as the practical relationships of all actors involved. The relationality of New Materialism holds great promise in future research with which to analyse university assemblages as they have grown and included many new actors and discourses both within the university and from outside.

New materialism spans a range of disciplines and theorists and due to space cannot be fully reviewed here. However for an overview and point of reference see Lupton (2019). I do however, offer brief examples below.

Barad's (2007) agential realism of intra-acting (rather than interacting) entanglements of agencies include discourse, causality, agency, power, identity, embodiment objectivity, space and time and include nature, culture and technology. Along similar lines Latour (2007) uses a sociology of associations as part of a wider Actor-Network theory to describe the unstable network of human and non-human actants which make up a network. Both Barad and Latour emphasise moving beyond a humanistic Anthropocene which sees humans as controlling the non-human with sole agency for our environment. Moreover, this humanistic view can often be solely male, white, western and privileged (Davies, 1997). Further, a humanistic view of technology and the non-human is often seen as instrumentalist (Matthews, 2021a) or radically at odds with being human (Hassan, 2018).

Braidotti (2013) proposed a move beyond such humanism which was not a crisis but an opportunity to be reflective as to what it means to live in an ecology of nature, other species, materiality and technology.
Posthumanism and seeing an ecological holistic relationship and assemblage of the environment and material, including the spatial, temporal, political, legal, economic, epistemological, technological and education (Braidotti & Bignall, 2019) allows for a more considered and criticality with potential futures of the idea of a university and not a binary techno-utopian or dystopian neoliberal future.

In similar ways to the three modes of university described above, posthumanism looks at what there is to be salvaged (Braidotti, 2019; Herbrechter, 2013; Jandrić & Bayne, 2017) from residual and legacy theory and practice but also as a way at looking at complex assemblages. For these reasons I argue that this has huge potential for the analysis of the Mode 3 Networked University. Rejecting one grand narrative idea and purpose of the idea and ontology of 'a university' (Herbrechter, 2018) is an important reflective project and timely in the ongoing development and enactment of the Mode 3 networked and unbundled university.

Discussion

The broad field of New Materialism offers a perspective with which to analyse and theorise the Mode 3 networked university which is in the process of growth, diversification and unbundling. I have described this process and genealogy starting with the elite, small scale mode 1 university with freedom to teach and research wherever enquiry leads. Building on the success of mode 1 coming out of the European Enlightenment period, the Mode 2 factory university is characterised by mass access and regulated inputs and outputs in a neoliberal knowledge economy environment to make teaching and research 'useful' to society. The Mode 3 university is emerging with permeable (two way and networked) boundaries making an assemblage of different actors including academics, technologies, management, government regulation, specialist roles (such as technology and design), industry etc. I argue that these characteristic modes leave behind a residue and create a path dependency influencing the future university as well as these modes being in tension and conflict.

The many facets of new materialism hold promise to make sense of these complex bundling and unbundling assemblages of the present and future university. For example Gourlay (2020) describes the laptop and digital learning environments not as merely tools but active and agentive agents exerting influence upon the idea of a university. Mapping human and non-human influences in the university as an assemblage, I hold presents an opportunity for a research agenda which takes into consideration the network of influences on the current and future idea and enactment of a university.

Such new materialist perspectives on the mode 3 university reject binary causalities of the present and future development of the idea and enactment of the university. At a micro scale we can see interactions between teachers, technologies and students as well as those working in learning and technology roles as one area of future study on working practices and student experience in the Mode 3 University. At a more macro level, such causal claims of neoliberalism as the cause of a business efficiency move towards the private sector and specialist roles in the unbundled university are refuted as reductive, whilst still being an actor in the assemblage. Moreover, claims of the inevitability of technology to revolutionise and change the idea of a university are equally refuted. Such tools of analysis present opportunities for the becoming and being of an assemblage of influences and actors as they increase in number and complexity.

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Critical success factors for Learning Management Systems in higher education: A literature review

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Abstract

Learning Management Systems count as a core component in the orchestration of learning in higher education and is widely prevalent around the world. This paper identifies the factors that are critical for learning management systems to be successful for learners. A literature review including 14 research papers forms the empirical basis and DeLone & McLean's (2003) model of IS success is used to map the papers. The papers focus on student users of implemented learning management systems, mainly studied through surveys. The analysis shows that 'user satisfaction' is most generally influenced by 'information quality' and 'system quality', while 'net benefits' is mostly influenced by 'user satisfaction'. The papers have either focused less on 'service quality', 'use' and 'intention to use', or they have not been able to identify significant correlations based on these variables. The findings are related to the role of LMS as mandatory information systems and the implications for the development of LMSs is discussed along with their role in higher education from a networked learning perspective.

Keywords

Learning Management Systems, LMS, Higher Education, Critical Success Factors

Introduction

Networked Learning is a research and practice field concerned with the intertwined phenomena of human/interpersonal relationships, technology, and collaborative engagement in valued activity (Networked Learning Editorial Collective (NLEC), 2021). Researchers within this field study how learners engage in learning through connections with other learners, tutors, communities, and resources, which is enabled by information and communication technologies (ICT) (Goodyear et al., 2004; McConnell et al., 2012). Learning management systems (LMS) count as a core technology for establishing some of these connections as they enable teachers and tutors to digitally manage course content and learning objects (McGill & Klobas, 2009; Ouadoud et al., 2018). LMSs are defined as a web-based software application that support teaching and learning by organizing administrative tasks, assisting in planning of courses, and providing students with information and course content (Nasser et al., 2011; Kasim & Khalid, 2016). The first generation of LMSs was initially developed to support practices of distance learning, but was quickly also embraced as a standard for supporting practices of campus-based higher education, and has been recognized as a solid part of educational technologies (Svensson et al., 2017; Aldiab et al., 2019). Today, LMSs are commonly considered to be a mandatory technology for both faculty members and students in preparing for and following higher education lectures (Petter et al., 2008; McGill & Klobas, 2009; Aldiab et al., 2019).

Previous studies have identified how the implementation of LMSs can be associated with various challenges that may differ across user and system types (Gunesekera, 2020). Generally, it is important that both faculty and students experience the benefits of using LMSs to ensure successful implementation (Song, 2011). However, the challenges are not just an expression of the technical solution, but also pedagogical initiatives (Ouadoud et al., 2018). In an e-learning review of students, instructors, and employees, Gunesekera (2020) identified differences

in correlations between different user groups, when it comes to 'user satisfaction' and 'intention to use'. Significant correlations were found for students and instructors. For all user groups usability attributes related to satisfaction had a positive impact on both 'intention to use' and 'net benefits'. On this basis, the study concludes that usability is an important focus point for developers of e-learning systems, and in particular aspects related to subjective satisfaction, learnability, and efficiency. In the current study we will take a student focus in answering the following research question: What characterizes the critical success factors of LMSs in higher education?

Theoretical framework

LMSs can be understood as an information system (IS) because of their affordances to store and display information (Teichroew, 2003). Critical success factors (CSF) reflect elements that need to be addressed to ensure the success of an IS (Miranda et al., 2014). To examine CSFs, DeLone & McLean developed a model of IS success that maps factors in achieving success with an IS (1992). A systematic literature review by Al-Nuaimi & Al-Emran (2021) analyzing the most predominant theoretical models for LMSs concludes the DeLone & McLean information success model (ISSM) to be among the most utilized. In the first version of the model, two constructs, 'information quality' and 'system quality', were modelled to be influencing factors on the constructs 'use' and 'user satisfaction', that were forming first 'individual impact' and then 'organizational impact' (DeLone & McLean, 1992). In 2003, the model was updated. Here 'service quality' was added, and 'individual impact' and 'organizational impact' were merged into the 'net benefits' construct. Furthermore, the 'use' construct was divided into two sub constructs: 'use' and 'intention to use' (Delone & McLean, 2003). Although 'use' and 'intention to use' are connected in the ISSM, the authors distinguish between them by describing the first as an attitude variable and the latter as a behavior variable. The current paper is attributing the 2003-version of the ISSM model to address the research question.

Petter et al. (2008) discuss the role of ISs as to whether they are associated with voluntary or mandatory use. Additionally, they discuss how that characteristic affect the 'use' and 'usefulness' of an IS. When an IS is voluntary, 'use' is an acceptable measure of success. However, if the 'use' is required, success may be measured better by means of 'usefulness'. Although a certain level of 'use' must be assumed in a mandatory IS, some variance can still be expected (Delone & McLean, 2003). With this argument in mind, the aim of this paper is to identify the CSFs of LMSs that enable students to reach the benefits of this type of IS.

Method of research

A systematic literature review (Booth et al., 2016) was carried out to answer the research question of this study. The search for research papers was conducted in the scientific databases Web of Science (ISI), Scopus (Elsevier), the ACM Digital Library, Academic Search Premier (EBSCO), ERIC and ABI/INFORM Complete (ProQuest). The databases were selected either because of their broad coverage or their specific topical focus.

The search string consisted of two facets. The first facet included terms related to CSFs, and the second contained terms related to LMSs. The facet for CSFs were based on the following search terms: 'success factor', 'success factors', 'IS success', 'information system success', and 'information systems success'. The LMS facet included a combination of variations of LMS inspired by Alshammari et al. (2018) and specific system names inspired by Kasim & Khalid (2016). To enhance the focus of the search, only peer reviewed papers published between 2011 and 2020 were included.

As seen in figure 1, a total of 1.346 papers were retrieved through the selected databases, leaving 1.068 papers after removing 278 duplicates. Subsequently, titles were assessed which resulted in 841 papers being removed due to irrelevant subjects. When assessing the abstracts of the remaining 227 papers, only papers that met the following criteria were included in the review: 1) Evaluation of specific and implemented LMSs, 2) Direct focus on students through data collection, 3) The CSFs must be related to the LMS, and not for instance learning or teachers, 4) Removal of papers related to distance learning, 5) Removal of papers about systems that do not entirely classify as a LMS, and 6) Focus on higher education. The sixth criterium was important, as the pool of retrieved papers did not only include papers about higher education, but also about workplaces and primary and secondary schools. The many criteria for being included in the review was chosen, as the aim was to identify papers that very precisely addressed the research question. They also explain the significant reduction of papers from the first query to the final number of 14 papers to be included in the review.

The abstract assessment resulted in 181 papers being removed, leaving 46 papers that met the criteria. For the full text assessment, at least two authors assessed each paper according to the 6 criteria mentioned above to ensure

reliability of the assessments. First, it was decided which papers should be included in the review by comparison between the authors' individual assessments. When disagreements occurred between the assessments, all three authors reassessed the paper. As a result of the full text assessment, 32 papers were removed leaving 14 papers as a part of the review.

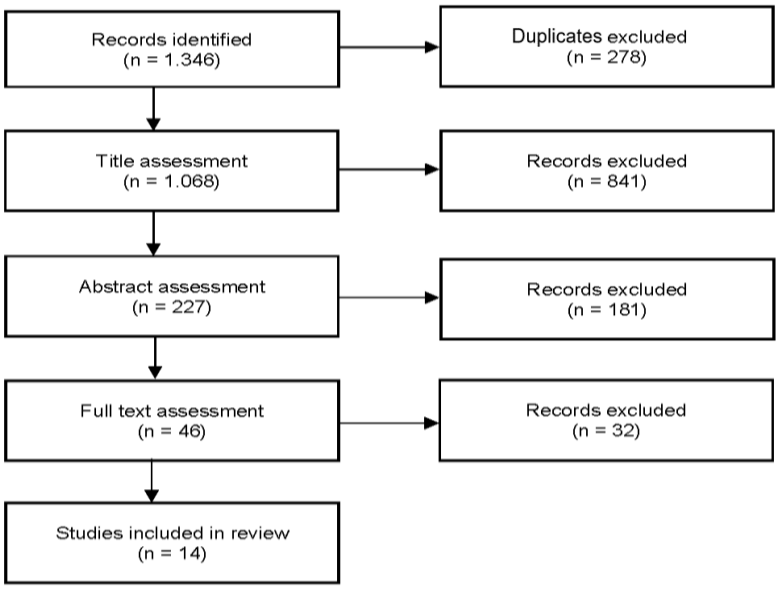

Figure 1: Flow chart of the process of selecting papers

The classification of the remaining 14 papers was carried out in Microsoft Excel. Each paper was mapped according to publication year and channel, geographical setting, applied research methods, theoretical framework, type of respondents, education level and pivotal system of investigation. Subsequently, the CSFs identified in each paper were mapped in accordance with the components of the 2003 version of the ISSM. For the mapping we identified significant correlations between ISSM variables in the papers. The aim of the mapping was to identify minor (identified in 1-2 studies), medium (identified in 3-4 studies) and major (identified in 5 studies or more) correlations between success factors across the studies. Needless to say, qualitative studies do not fit into this kind of mapping. Instead, we have looked towards qualitative elements in the studies for explanations of the results of the mapping. Papers based on alternative theories were mapped according to the ISSM. Other papers required interpretations of the terms used in the ISSM as they were not consistent with the terms used by the ISSM. To illustrate, in Pérez-Pérez, Serrano-Bedia & García-Piqueres (2020) the term 'perceived learning outcome' were considered to correspond to 'net benefits'. Likewise, Ramírez-Correa et al. (2017) used 'perceived LMS satisfaction', which can be directly converted into 'user satisfaction'.

Results

General characteristics

Table 1 displays an overview of bibliometric and general characteristics of the 14 papers. The publication of papers was dispersed across the selected period, with four years not being represented. Most papers were published in journals (13), while only conference paper was included. All papers utilized surveys as research method, which was combined with respectively a case study and interviews in three papers. Similarly, all papers targeted students as respondents in the research, which was supplemented with instructors in one paper.

Publication year	2012 (2), 2014 (3), 2016 (2), 2017 (1), 2018 (2), 2020 (4)
Channel	Conference paper (1), journal paper (13)
Research methods	Survey (11), combined (3)
Respondents	Students (13), students and instructors (1)
Theoretical framework	IS (2), modified IS (8), TAM (2), modified TAM (2), other (2)

Table 1: Bibliometric and general characteristics of the 14 papers

Two papers applied the ISSM as their theoretical framework (Ramirez-Correa et al., 2017; Arenas-Gaitán et al., 2018), while eight utilized a modified version of the model (Kim et al., 2012; Lwoga, 2014; Mtebe & Raisamo, 2014; Ghazal et al., 2018; Abdurrahaman et al., 2020; Koh & Kan, 2020; Ngo Ngoc Minh, 2020; Pérez-Pérez et al., 2020). Two papers (Indahyanti & Sukarjadi, 2015; Asampana et al., 2017) built on the technology acceptance model (TAM) (Venkatesh & Bala, 2008), while another two applied modified versions of the model (Ghazal et al., 2018; Pérez-Pérez et al., 2020). Out of the above-mentioned papers, two combined modified versions of the ISSM and TAM models in the research. Lastly, one paper utilized institutional theory (Naveh et al., 2012), while another developed their own model (Valsamidis et al., 2016).

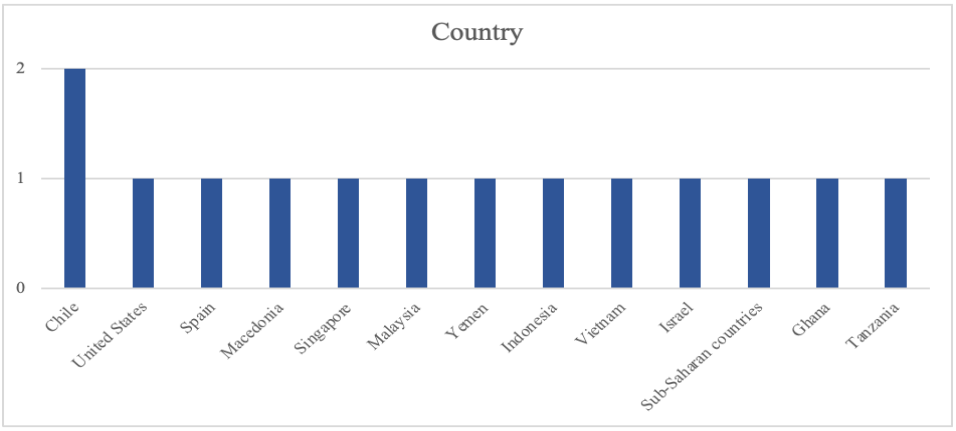

Figure 2: Geographical setting of papers

Furthermore, the papers were mapped according to the geographical setting of the conducted research. Figure 2 shows an overview of the geographical distribution of papers. In general, the papers were dispersed across five continents, with Asia and Africa having most representations in respectively six and three papers. Europe and South America were represented in two papers each, whereas North America was represented in one paper.

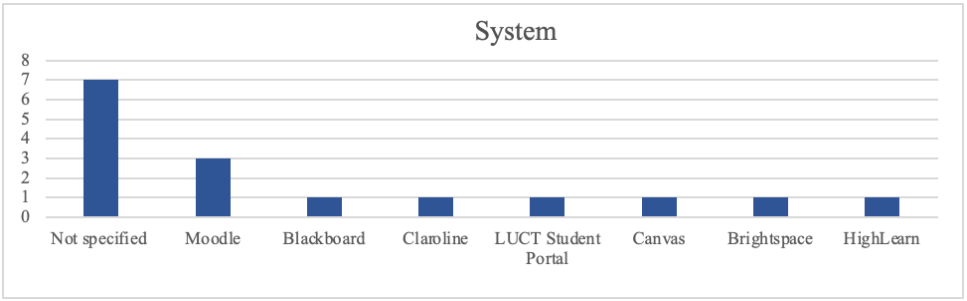

Figure 3: System specification

The pivotal system of investigation was additionally mapped according to type and system specification. Figure 3 displays an overview of the specified systems. Seven papers did not specify the exact system of investigation. Out of these, six described the system as a LMS and one as a CMS. Out of the remaining eight, Moodle was studied in three papers, while Blackboard, Claroline, Canvas, Brightspace, LUCT and HighLearn were investigated in one paper each.

Identified critical success factors

Figure 4 presents the mapping of significant correlations between ISSM constructs identified in the 14 papers. The figure illustrates how the major correlations link from ‘system quality’ and ‘information quality’ to ‘user satisfaction’ and from ‘user satisfaction’ to ‘net benefits’. The following sections present the figure in detail and elaborate on the findings from the reviewed papers.

System quality has been measured as a determinant factor of 'use' (3 studies), 'intention to use' (1 study) and 'user satisfaction' (9 studies) in the retrieved papers. The results show a significant positive relationship between 'system quality' and 'use' in two out of three papers (Mtebe & Raisamo, 2014; Ramirez-Correa et al., 2017). Mtebe & Raisamo (2014) stress the implications for system developers, who should ensure a user-friendly interface as well as making sure the LMS is easy to use and easy to learn to maximize use and suit the system to the context of learners. In a third paper, the overall results did not support 'system quality' as a direct antecedent of 'use', although the authors noted it will indirectly affect the level of 'use' if it reverts in greater 'user satisfaction' (Arenas-Gaitán et al., 2018).

Additionally, 'system quality' emerged as a significant positive determinant of 'user satisfaction' in eight out of nine papers, who measured the variable. Lwoga (2014) emphasized the importance of 'system quality' characteristics, e.g., response time, interactivity, interface and design functionalities to increase the utilization and satisfaction of the LMS. Similarly, Ghazal et al. (2018) suggests that interactivity, a user-friendly interface, and response times are important factors for user satisfaction. User friendliness was also a prominent 'system quality' related factor highlighted among reliability, data flexibility, integration and ease of use in relation to navigation and findability in another study that showed a significant positive relationship between 'system quality' and 'user satisfaction'. However, the paper showed an insignificant relationship between 'system quality' and 'intention to use' (Abdurrahaman et al., 2020). Pérez-Pérez et al. (2020) also found 'system quality' as a predictor of 'user satisfaction', stressing the importance of a reliable, quick, stable and accessible system. From qualitative interviews, Naveh et al. (2012) elaborated upon the need for efficient navigation and easy access to relevant information, stressing how students compare course websites to other information services, e.g., Google, and thus have high expectations for simple and convenient navigation.

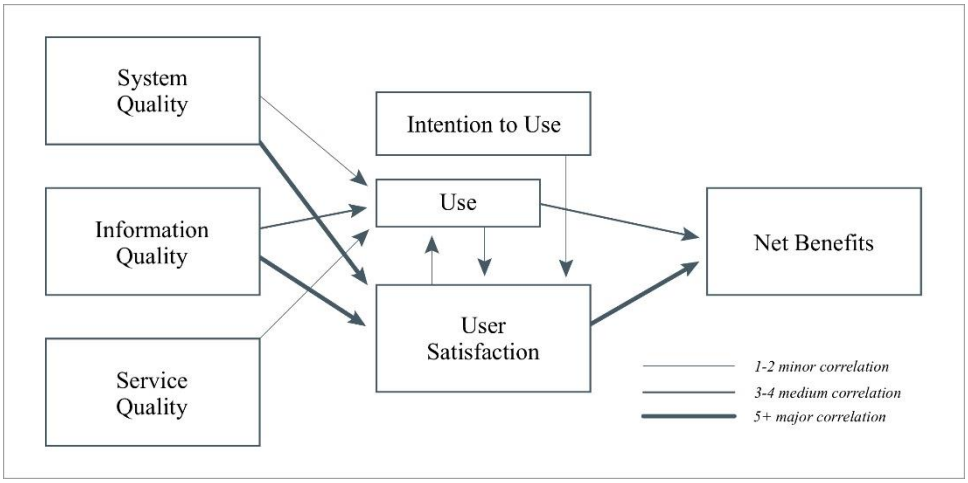

Figure 4: Mapping of identified correlations in the reviewed papers

Koh & Kan (2020) measured the perceptions of LMS quality and satisfaction in three segments of users characterized by different levels of perceived usage frequencies. They found 'system quality' to be a significant predicter of satisfaction for average frequency and frequent users. According to the authors, the findings foster theoretical implications for contextualizing the ISSM for LMS evaluation, as perceptions of quality and satisfaction may differ according to whether the user perceive themselves as frequent, average, or infrequent LMS users. Arenas-Gaitán et al. (2018) also utilized user segmentation to fit the ISSM more accurately, when analyzing the excellence of a LMS and showing the impact of new Internet tools on the students' perceptions of LMS. Latent class segmentation was applied resulting in two distinct user groups: 1) one characterized by attributing greater importance to the pivotal LMS of investigation, 2) the other characterized by a stronger prominence of Facebook. Regarding implications for LMS development, improvements should derive from 'system quality' related factors, e.g., adapting mobile systems, aligned with the preferences of the user group that values LMSs. Primary LMS improvements should on the other hand focus on factors related to 'system quality' and 'information quality', e.g., integration with commonly used tools or applications, aligned with the user group that values Facebook. Context-dependent variables related to the users were also incorporated into the ISSM by Ramírez-Correa et al. (2017), who found that learning styles had a modifying effect on the relationship between the ISSM variables. Regarding 'system quality' they found that the sensing-intuitive dimension and sequential-global dimension moderated its relationship with 'user satisfaction'.

‘Information quality’ has been measured as a determinant factor of ‘use’ (3 studies) and ‘user satisfaction’ (10 studies) in the retrieved papers. Here, the relation between ‘information quality’ and ‘use’ was found to be significant in three out of three papers, while information quality emerged as a determinant factor of ‘user satisfaction’ in eight out of 10 papers. Koh & Kan (2020) found ‘information quality’ as a significant predictor of ‘user satisfaction’ for infrequent and average frequency users, while no significant correlation was found with frequent users. In another study, ‘information quality’ was found as the most relevant determinant of ‘user satisfaction’ to all respondents, which leads the authors to deduce that when the information provided is perceived as useful and up-to-date, the users feel more satisfied and thus interested in using the LMS (Pérez-Pérez et al., 2020). In general, timeliness and accuracy have been found as recurring implicating factors throughout the studies who found ‘information quality’ as a determinant of ‘user satisfaction’. This aligns with the results of Mtebe & Raisamo (2014) stressing the implications for instructors, who should ensure accurate and up-to-date course content to both maximize ‘use’ and enhance ‘user satisfaction’ with the LMS. Abdurrahaman et al. (2020) also showed ‘information quality’, i.e., completeness, accuracy, relevance, consistency, and timeliness had a large effect on ‘user satisfaction’, encouraging the LMS management to ensure everyday efforts to provide quality information to the users. Similarly, Naveh et al. (2012) found a significant positive correlation between overall ‘user satisfaction’ and quantity of items posted on the LMS, suggesting that satisfaction increases concurrently with a more complete repository of learning materials. However, if the posted items are not current and up-to-date, satisfaction decreases. Contrary, Lwoga (2014) showed an insignificant relationship between ‘information quality’ and ‘user satisfaction’, which may be ascribed to the newly introduction of the system according to the author. Similarly, Ghazal et al. (2018) showed an insignificant influence of ‘information quality’ on easiness of use and satisfaction, which according to the authors can be due to a pre-existing positive perception of the online course quality

‘Service quality’ relates to services of the IS and has been measured as a determinant a factor of ‘use’ (1 study), ‘intention to use’ (1 study), and ‘user satisfaction’ (4 studies). All of the papers measuring ‘service quality’ examined the relationship between ‘service quality’ and ‘user satisfaction’, but no significant association was observed between the two success dimensions. Mtebe & Raisamo (2014) found that ‘service quality’ had a positive effect on ‘use’, but Abdurraham et al. (2020) found no significant relation between ‘service quality’ and ‘intention to use’. Mtebe & Raisamo (2014) argue that because of the low exposure to ICT solutions for students in developing countries, institutions need to provide support services such as training, hotline and helpdesk. This is supported by Ghazal et al. (2018) and Lwoga (2014) who argue that technical support can aid students at using the e-learning system, leading to increased ‘user satisfaction’. According to Abdurraham et al. (2020), the institution needs to consider their service delivery to identify where they fall short as improving service delivery can as well make the students satisfied.

‘Use’ has been measured as a significant determinant factor of both ‘user satisfaction’ (2 studies) and ‘net benefits’ (3 studies). Mtebe & Raisamo (2014) argue that if students use the LMS more frequently and efficiently, they are likely to improve their learning outcome and thus ‘net benefits’. Therefore, universities should find strategies to ensure a higher degree of LMS use to increase users’ satisfaction with the LMS. Asampana et al. (2017) argue that the availability of infrastructure, teacher ICT proficiency, and teacher frequency on online engagement and prompt responds to technical concerns of students improve students’ ‘use’ of a LMS. Furthermore, they found that students’ intention to use a LMS depend on computer facilities. ‘Intention to use’ has not been measured as a determinant factor of any variables of the ISSM in the retrieved papers, while only one paper sought to measure ‘system quality’, ‘service quality’ and ‘user satisfaction’ as determining factors of ‘intention to use’. As LMSs are often considered mandatory systems for students in higher educations, the little focus on ‘intention to use’ can be due to the students are obliged to access the LMS to find e.g., course materials. Therefore, the proper measure of success may often relate to attitude-oriented measures in preference to behavior-oriented measures when the system is characterized by mandatory use.

User satisfaction has been measured as a significant factor of ‘intention to use’ (1 study), ‘use’ (1 study) and ‘net benefits’ (5 studies). Arenas-Gaitán et al. (2018) argue that universities are responsible for their students’ satisfaction in how they deliver knowledge. They must improve their e-learning environments in correspondence with the students to enhance their learning experience. This is supported by Mtebe & Raisamo (2014) who present a hypothesis that equate ‘user satisfaction’ with the level of LMS ‘use’. If universities deliver a proper LMS that satisfy the students, the students also tend to utilize the system to a greater extent. Abdurrahaman et al. (2020) found a significant relation between ‘user satisfaction’ and ‘intention to use’ and argues that when students are satisfied with the LMS, it affects their intention to use the system. In Pérez-Pérez et al. (2020), a high correlation

was found between ‘user satisfaction’ and ‘net benefits’. They describe the net benefits as ‘perceived learning outcome’ and argue that better learning performance depends on students’ satisfaction.

Discussion and concluding remarks

This paper reports the process and findings from a systematic literature review aiming to identify factors that are critical for LMSs to be successful in higher education. Throughout the process, it has been attempted to ensure transparency in the systematic approach. However, certain limitations should be acknowledged regarding the delimitation of the search query and inclusion criteria. The search string consisted of two facets representing CSF and LMS related terms respectively. Consequently, the papers included in the review were mainly attributing either ISSM, TAM, or a modified version of both. It can be discussed whether papers were excluded unintentionally. Studies with a focus on user satisfaction, but with no mention of IS success could have elaborated our understanding of CSF but have not been included due to the nature of the search query. As one of the inclusion criteria focused on students, studies that merely focused on instructors or other stakeholders were removed. However, Cigdem & Topcu (2015) argue that it is important to include instructors when examining LMSs as their ‘intention to use’ the LMS is essential to a successful implementation. This is acknowledged as a limitation in the current study, but at the same time it was an active delimitation of the scope. When assessing the papers, it also became clear that they all utilized quantitative surveys as their primary method for data collection. Future studies should include qualitative methods for a more nuanced view of CSFs in LMSs.

The analysis reveals a substantial focus on ‘user satisfaction’ as a success dimension with major correlations to both ‘system quality’ and ‘information quality’ as determinant variables in the 14 papers. This implies that the satisfaction of learners is highly explained by the quality of the system and the information provided within the system. Furthermore, the findings showed minor or medium correlations between all quality related measures and the two use-based success dimensions. This pattern implies a greater emphasis on satisfaction compared to usage in LMS research, which may be alluded to the mandatory characteristic of the technology (McGill & Klobas, 2009). Further, quality factors related to the system may not affect the use, as users are already obliged to a certain degree of interaction with the system. Nevertheless, ‘use’ and ‘intention to use’ can yield ‘net benefits’ on various levels, which in turn can impact the level of ‘user satisfaction’ and the further ‘use’ of the system. The findings showed a medium correlation between ‘use’ and ‘net benefits’, while none of the retrieved papers measured ‘intention to use’ as a determinant factor of ‘net benefits’. A major correlation has been identified between ‘user satisfaction’ and ‘net benefits’, which again highlights the general preference of assessing satisfaction as a measure of success compared to use. Hence, the findings support the importance of assessing the system according to its status as either voluntary or mandatory, and correspondingly whether acceptable measures of success are behaviour or attitude oriented. Moreover, to ensure the prerequisites of users reaching the preferred ‘net benefits’, the findings emphasize the importance of securing quality factors related to the system and the provided information.

The above expresses general commonalities across the 14 research papers investigating implemented LMSs, however, the individual findings should necessarily be viewed in light of its specific context. As expressed by Koh & Kan (2020), the learners’ perceptions of the quality related factors of the ISSM may vary according to discipline and context, which points to a need for contextualization efforts in LMS evaluation. Other factors related to the user characteristics were similarly identified in the current review, such as learning styles, which Ramírez-Correa et al. (2017) found to have a modifying effect on the relationships between the variables of the ISSM. Additionally, some studies included measures that exceeds the ISSM to improve the contextualization of the model. Since the model does not cater to user interaction, Koh & Kan (2020) included the measure ‘interaction quality’, which considers both peer and instructor interaction to articulate the pedagogical dimension of LMS evaluation with respect to students of the arts. Similarly, Pérez-Pérez et al. (2020) adapted ‘communicativeness’ as a variable referring to the facilitation of both teacher-student and student-student interactions as predictor of perceived learning outcome. The inclusion of such measures for evaluation can add to the value of the model in a networked learning context.

Furthermore, some papers touched upon the need to consider different strategies to enhance the value of LMS from information sharing and one-way communication to foster more collaborative instructional dimensions (Koh & Kan, 2020), student cooperation (Arenas-Gaitan et al., 2018) as well as peer and teacher interactions (Pérez-Pérez et al, 2020). These identified potentials have previously been a point of criticism regarding the role of LMSs in higher education. Despite the extensive prevalence of the technology, it has been depreciated for emphasising an instructor-centric assumption, thus enabling the administration of learning rather than enabling learning itself

(Brown et al., 2015). Previous research shows how LMSs are primarily used to support communication with instructors and accessing learning materials, while student collaboration and dialogue is unfolding in parallel practices outside the LMS (Caviglia et al., 2018), thus constituting alternative technological infrastructures to the ones offered by the institution (Thomsen et al., 2016). This is also manifested within networked learning, as the focus seems to have shifted from LMSs and VLEs towards social media and services residing outside the institution's technological infrastructures (de Laat & Ryberg, 2018). However, if students and instructors does not inhabit the same socio-technical environments, it can be difficult to organize shared places in which they challenge each other and co-develop new practices with networked technologies. This underlines the importance for institutions to adopt a broader view of digital learning environments beyond the LMS (Thomsen et al., 2016; Caviglia et al., 2018). According to Brown et al. (2015), the next generation of digital learning environments do not only encompass a single application, but rather an ecosystem of applications, content and platforms that can be assembled in customized ways. Such ecosystems can provide learners with multiple entry points to networked learning, in which LMSs can be retained as a core component for the administration of learning, while being further advanced to promote dialogues with both online resources as well as with others, which can impact the students' perceived learning outcomes more than just having access to information (Pérez-Pérez et al., 2020).

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On the nature of social interactions and cognition in learning communities

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Abstract

Whether explicitly used as a research aim or implicitly discussed as an outcome, the concept of community is central for the networked learning research as it allows networked learning researchers to study how people perceive the networked environment as a space, wherein the members can develop relationships among one another. The underlying premise for this work is that it is erroneous to assume a learning community is a unified concept, functioning in the same way for everyone under same circumstances. Taking the contextual factors into account, this research questions the characteristics of a community that are related to learning. I explore how different types of relationships among members of a learning community are related to learning. In particular, I conceptualise the concept of community using social capital theory. Since the central tenet of social capital theory is that different relationships within networks of people hold different values, I argue that it can inform the ways by which the perceived level of learning is understood with respect to interaction patterns. The findings suggest that both distributed–diverse communications and strong–close communications are manifest in learning. However, the impact of diverse relationships on learning is considerably larger and stronger compared to denser relationships. The implications are discussed.

Keywords

Learning community, Cognitive Presence, Social Capital

Introduction

There is no doubt that learning is simultaneously an individual and social process, situated in its social context. It is through this dialogic approach that we can reconceptualise learning as "a matter of engagement, participation, and membership in a community" (Nasir & Cooks, 2009, p. 42). Indeed, the notion of learning community is central for the theory and practice of networked learning. Defined as "learning in which information and communication technology is used to promote connections … between a learning community and its learning resources" (Goodyear, Banks, Hodgson, & McConnell, 2004, p. 1), networked learning research puts a strong emphasis on the concept of community. This is not entirely surprising because networked learning "suggests a relational view in which learning takes place in relation to others" (Jones, Ferreday, & Hodgson, 2008, p. 90).

The question, therefore, we need to ask is which aspects of the relationships in a community best support or promote learning. It will be erroneous to assume a learning community functions in the same way for everyone under same circumstances. A community is in flux and how it functions is contextual. Etymologically, community is derived from the Latin word "communis", which means common. The idea of commonality is inherent in the meaning of community. According to the Oxford Online Dictionary, community is a group of people with common values, attitudes, and interests. Then, what are the common values, attitudes, and interest that impact networked learning activities? Which characteristics of a community are related to perceived learning?

Here, in this research, I explore how different types of relationships among members of a learning community are related to perceived level of learning (below, I explain why it is "perceived level of learning" instead of learning). In particular, I conceptualise the concept of community using social capital theory. Since the central tenet of social capital theory is that different relationships within networks of people hold different values (Oztok, Zingaro, Makos, Brett, & Hewitt, 2015), I argue that it can inform the ways by which the perceived level of learning is understood with respect to interaction patterns. I suggest that this nuanced understanding of community may contribute to the ways in which networked learning researchers can conceptualise and study pedagogical activities within a learning community.

Before articulating the details of the research explained in this manuscript, it is important to clarify where it is situated in the literature of networked learning research. As I have already argued above, the importance of the concept of community for networked learning is evident in the variety of perspectives and frameworks employed for studying it. Nevertheless, a considerable number of studies challenged the idea that community is a central tenet of networked learning, or defied a preconception that community is a unified construct. A study cited in Jones et al. (2008), for example, examined the overall patterns of interactions and suggested that weaker ties and looser groupings can afford better opportunities for sharing knowledge. In this research, I acknowledge both approaches to community as in that I do not necessarily argue whether community is necessary or even fundamental for networked learning. I do not privilege any type of relationships; rather, I employ the concept of community in a general sense for referring to a set of students in a given learning space. Community means, within the parameters of this research, a group of students in a digital space taking the same course when it was offered in a particular term or year, who use digital technologies to connect with one another as well as connect with teacher(s) and learning resources. Therefore, this manuscript does not offer any discussion about the relationship between network and community since it is not the aim or focus of this paper neither does it investigate whether the ties that bind a community should be weak or strong.

Theoretical Background

The concept of community in networked learning

Whether explicitly used as a research aim or implicitly discussed as an outcome, the concept of community is manifest in overwhelming majority of the networked learning research. It is a fundamental concept as it allows networked learning researchers to study how people perceive the networked environment as a space, wherein the members can develop relationships among one another (Carson, 2014). Since the definition of networked learning strongly argues for establishing healthy connections among participants, the concept of the sense of community provides means by which the networked learning researchers can study the quality of those connections. Dialogue, sense of isolation, consensus, trust, and identity are among the main research directions that the networked learning researchers explored in relation to the sense of community (see, for example, Brouns & Hsiao, 2012; Davis, Cronin, & Seitzinger, 2014; Tremblay, 2018). It is equally important to acknowledge studies adopting more decentralised approaches to a learning community (see, for example, Jones et al., 2008). Yet, even in these studies overall patterns of interactions are examined in relation to knowledge sharing and dialogue, which ultimately can lead to higher levels of perceived learning.

Networked learning research links the concept of community with cooperative and collaborative forms of learning (de Laat & Ryberg, 2018). This is reasonable since the pedagogical principles underlying these learning activities are inherently concerned with how people engage with and react to each other in group-based work. Networked learning researchers, then, study dialogue (Crosta & Gray, 2014), knowledge construction (Lee, Rahmat, Lim, Lin, & Tan, 2018), distributed cognition (Parchoma, 2016), high-level thinking (Ramanau, Sharpe, & Benfield, 2008), and critical thinking (Corich, 2006). It is important to reiterate here that while these studies can have different views on what community is, it is clear that they have a shared perspective on what community does: it provides a space in which a group of people work together towards a common goal, whether this common goal is learning a subject, solving a problem, or creating an artefact (Oztok, 2021).

Social Capital in Learning Communities

Social capital has been employed by many sociologists to study connections within and between social networks. Bourdieu (1986) defined social capital as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition” (p. 249). Because social capital is inherent in the structure of relations between and among actors, it can offer means to study the structures of social relations among community members by allowing systematic investigations into the ways that relationships and connections are diffused in communities. Social capital can be used to explore the benefits gained by the individual within the community as well as how the community can benefit from social capital through the development of interaction among its members (Oztok et al., 2015). Thus, the central tenet for social capital is that different relationships within and between social networks hold different values. How can we study these different values and their outcomes? Two types of social capital are most prominent: bridging and bonding.

Bridging social capital refers to the diversity of relationships with people from other communities, cultures, or socioeconomic backgrounds. Typically, bridging social capital provides “a basis for collective action” (Pigg &

Crank, 2004, p. 68) by allowing individuals to "share their histories and experiences, as well as establish their common values and prosocial goals" (Tseng & Kuo, 2010, pp. 1044–1045). It is possible to argue, then, that bridging social capital can help to explain the relationship between diverse social interactions and perceived level of learning in collective pedagogies.

Bonding social capital refers to the strong ties of attachment between relatively homogeneous individuals. Individuals with similar interests or backgrounds develop higher levels of bonding social capital, which leads them to establish and maintain peer relationships. These stronger relationships, then, provide important environmental conditions for knowledge exchange by allowing information to flow throughout the existing social contacts (Chiu, Hsu, & Wang, 2006). Bonding social capital, therefore, improves the acquisition of knowledge and fosters learning in a community (Daniel, Schwier, & McCalla, 2003). Consequently, bonding social capital may help explain the relationship between strong social interactions and perceived level of learning in collective pedagogies.

It is important to note that bridging social capital and bonding social capital are not mutually exclusive; they are "relative conceptions, and [they] may coexist in any given set of relationships" (Jones et al., 2008, p. 91). However, much research favours bonding social capital (stronger ties) as it is deemed to be a necessary condition for any collective work. The works cited in Jones et al. (2008) and Oztok (2013) can be a counter argument to this perspective. Both studies argue that weaker ties and looser connections are necessary for improving the variety of information being shared. In this research, I do not privilege one type of capital over the other; simply, I explore the relation of them to the perceived levels of learning.

Overall, the educational value of social capital lies in its ability to provide opportunities for members to establish a common ground where a relatively coherent sense of community can be created. Having established a strong sense of community, norms of reciprocity can be cultivated through which individuals can share knowledge and negotiate meanings.

Perceived level of learning and Cognitive Presence

The definition of networked learning does not imply what learning means but simply suggests that it will occur as a result of collective actions, leaving the nature of learning activities or the expected outcomes open to interpretation. Consequently, there is a plethora of approaches to and frameworks for studying learning in networked learning research. Theories, such as constructivism, Actor-Network Theory, Activity Theory, or socio-material perspectives – just to name a few – have been employed to conceptualise and measure learning.

Similarly, measuring learning in digital spaces has always been problematic from theoretical and methodological points of view (Rourke & Kanuka, 2009). By and large, surveys are employed to assess perceived learning as an indicator for interpreting critical thinking, epistemic development, or meaningful learning. These cursory efforts at assessing learning are arguably unreliable or inconclusive. Researchers that are more sensitive to the limitations of their probing tools have been suggesting "perceived level of learning" is a more nuanced term that better reflects what these surveys are measuring (Rourke & Kanuka, 2009). I concur with this perspective and employ the notion of perceived level of learning instead of learning. Therefore, in this study, I employ the cognitive presence model for interpreting students' perceived level of learning.

Cognitive presence is "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Garrison, Anderson, & Archer, 1999, p. 89). It comprises four types of hierarchical discourse: triggering events, exploration, integration, and resolution. Deep learning is said to occur when these four steps are manifest in a discussion. In other words, it is only when students reach to the level of resolution in a discussion, they can critically examine new facts and make deep connections with their existing knowledge structures.

Data Sources and Method

I collected data from 13 online postgraduate level courses over three years between September 2018 – 2021, from large research universities in the UK and Canada. At minimum, all courses had the optimum class size to support and sustain critical discussion, and they offered weekly discussions, where students are required to engage with each other. Students came from diverse historical and cultural backgrounds, different geographical locations, and were of various ages and professions (Table 1).

At the end of the courses, I administered a Likert-type online survey with ten-point questions, comprising three main sections. In the first section, I examined students' perceived level of cognitive presence through a questionnaire, adopted from research explained by Akyol and Garrison (2008). In the second and third sections of the survey, I measured students' perceived level of social capital by assessing the nature and value of social ties and relationships that students hold in their learning communities. In specific, the second section measured the types of social capital (bridging or bonding) using an already established survey (Oztok et al., 2015) whereas the third section measured dimensions of social capital (social dimension, relational dimension, and cognitive dimension), using a survey from a studied explained in research by Choi, Kim, Sung, and Sohn (2011).

Before moving on to data management, it is important that I discuss the validity of surveys used in this research. There are three levels by which validity can be discussed. First, all three surveys are developed for and validated as a data a gathering tool in online spaces. Given the contexts of courses and demographics of students are similar to a great extent between this study and the studies where these tools are developed, it is possible to argue that there is no need to further probe the validity of the data gathering tools employed in this research. Second, because I do not aim to alter or develop but rather verbatim employ the concepts that these data gathering tools are measuring, it is fair to argue that there is no need to further probe the validity or reliability of these tools. For example, I accept and employ the definition of cognitive presence explained in Akyol and Garrison (2008), or strictly follow the categories explained by Choi et al. (2011); therefore, I did not need to revise questions – or even revise wordings – in these surveys. I did employ these surveys exactly as they are, which renders further validity and reliability checks unnecessary.

A total of 631 students responded to the survey. However, in order to address the potential bias of "inactive" students, data from 23 students were removed as they posted less than four notes in total (less than one note for every three weeks) and received one or no replies overall. While I acknowledge that data from these students may be valuable for understanding why they appear to be excluded from the learning community, such an analysis is beyond the aim and scope of this paper as I focus on understanding the social dynamics among members that do belong to a community. Furthermore, data from 15 students were removed as they did not fully complete the survey (or left large sections of the survey empty). Overall, I report data from 593 students.

Category		Loading
Age		
	< 30	42
	31 – 40	203
	41 – 50	199
	> 50	94
	No Answer	55
Study degree		
	PhD	181
	EdD	67
	MA	108
	MSc	81
	MEd	93
	MRes	59
	No Answer	4
Location		
	Asia	44
	Europe	231
	North America	202
	South America	12
	Africa	39
	Oceania	59
	No Answer	6
Work experience		
	< 5	64
	6 – 10	193
	11 – 15	239
	16 – 20	67
	> 21	23
	No Answer	7
		N=593

Table 1: Demographics

Findings

I used multiple linear regression analysis to examine the relationship of social capital to cognitive presence. 22 cases were removed from the analysis because they were strong outliers (at least 2 Std. Deviation from the residual mean) with large Cook's distance, substantially biasing the interpretation of the model. Table 2 represents the descriptive statistics after the outliers removed.

	Mean	Median	Std. Deviation
Bridging social capital	6.98	7.00	1.76
Bonding social capital	6.45	7.00	2.15
Social Dimension	7.02	7.00	1.78
Relational Dimension	5.96	6.00	1.98
Cognitive Dimension	6.03	6.00	1.99
			N=571

Table 2: Descriptive Statistics

The multiple regression analysis revealed that types and dimensions of social capital have different levels of impact on cognitive presence (Table 3). Bridging social capital ($\beta = .456$, $t(570) = 21.987$, $p < .001$), bonding social capital ($\beta = .05$, $t(570) = 5.258$, $p < .001$), and social dimension of social capital ($\beta = .463$, $t(570) = 22.801$, $p < .001$) have a significant impact on cognitive presence while relation dimension of social capital ($\beta = .006$, $t(570) = 0.991$, $p > .5$) and cognitive dimension of social capital ($\beta = -.005$, $t(570) = -.741$, $p > .5$) do not.

	β	Std. Error	t
Intercept	0.286	0.083	3.434 *
Bridging social capital	0.456	0.020	21.987 *
Bonding social capital	0.052	0.009	5.258 *
Social Dimension	0.463	0.020	22.801 *
Relational Dimension	0.006	0.007	0.919
Cognitive Dimension	-0.005	0.007	-0.741

N=571, *$p < 0.001$, R^2=0.961

Table 3: Multiple Linear Regression Analysis

What the Table 3 shows, in simple terms, is that for every 1 unit increase in bridging social capital, the cognitive presence increases by .45 units. A unit here refers to the average score in the questionnaire. Operationally, this means that if somebody's bridging social capital raises from, say, 5 to 6, that person's cognitive score will increase by 0.45 points. Similarly, for every 1 unit increase in bonding social capital, the cognitive presence increases by .05 units and for every 1 unit increase in social dimension of social capital, the cognitive presence increases by .46 units. Therefore, the model predicts: Cognitive Presence = 0.45 x bridging social capital + 0.05 x bonding social capital + 0.46 x social dimension of social capital + 0.286.

Overall, the regression model explains 96% of the total variance ($R^2_{adjusted} = .961$) of cognitive presence ($F(5, 565) = 2850$, $p ,< .001$). For the model, the median value is reasonably close to zero (.013), meaning that residuals are symmetrical and that the model is predicting evenly at both the high and low of the data set. In statistical terms, the model is not skewed.

Table 4 below shows the correlation coefficients of variables to cognitive presence.

	α	**Sig.**
Bridging social capital	0.958	0.001
Bonding social capital	0.763	0.001
Social Dimension	0.959	0.001
Relational Dimension	- 0.030	0.741
Cognitive Dimension	0.034	0.459

Table 4: Correlation coefficients and significance

Discussion

The underlying premise for this work is that it is erroneous to assume a learning community is a unified concept, functioning in the same way for everyone under same circumstances. Taking the contextual factors into account, this research questioned the characteristics of a community that are related to learning.

In the language of statistics, the results show that both bridging and bonding dimensions of social capital have statistically significant impact on the perceived level of cognitive presence though the effect size of the bonding social capital is arguably weak. The results echo the findings in previous research (see, Daniel et al., 2003; Oztok et al., 2015; Pigg & Crank, 2004). Similarly, social dimension of social capital has statistically significant impact on the perceived level of cognitive presence while relational and cognitive dimensions do not. Below I will explain how to interpret these results.

Let me reiterate that bridging social capital refers to the diversity of relationships with people from other communities, cultures, or socioeconomic backgrounds. The emphasis is on how the individual can benefit from the community as opposed to the benefits gained by the community from its members (Oztok et al., 2015). Broadly speaking, the results indicate that in a learning community, students prefer communication patterns that favour personal benefits. It is important to note that this does not mean strong, close personal ties that is favoured by bonding social capital are irrelevant. Simply, it means that when cognitive presence is considered, students value the diversity of social ties.

Why individual benefits are more favourable than collective aims? I can offer three hypotheses.

First, collective practices can be inherently privileging diverse relationships over dense social ties. Some research suggests, for example, that students do not preferentially reply to the most active students or to the instructor (Zingaro, 2012). That is, participants may be more concerned with setting wide nets rather than cultivating close friendships. Such behaviour is in fact in line with interactive pedagogies whose effectiveness stems from students reaching shared understandings with those of differing opinions (Chi, 2009). By discussing and challenging a variety of online participants, students are exposing themselves to ideas disparate from their own.

Second, it is possible that students engage with each other professionally and do not utilise personal knowledge, which in return may be hindering communal ties (Wasko & Faraj, 2005). In other terms, students can be refusing to develop close relationships and stronger social ties with their peers because the very nature of online learning communities can be problematic for community-building. This is not entirely surprising since students in a learning community come together not because they know who others are or because they share similar interests, but because they have simply enrolled in the same course (Oztok, 2013).

Third, the CP can be biased towards measuring learning from individual point of view. It is possible that there is an error or bias in the ways that research has conceptualised and measured cognitive presence. That is, the measurement of cognitive presence may be mostly concerned with the diversity of social ties and disregards the quality of those relationships.

Conclusion

Connections among members of a learning community is vital for networked learning. Broadly speaking, this research suggests that both distributed–diverse communications and strong–close communications are manifest in learning. However, the impact of diverse relationships on learning is considerably larger and stronger compared to denser relationships. The results strongly suggest that diversity of perspectives, approaches, frameworks, or concepts should be taken into account when teaching/learning activities are planned. Diversity is at the centre of a learning community. Of course, this does not mean that strong relationships are insignificant. On the contrary, without such strong, dense relationships, a sense of learning community is diminished and there is no learning community as such. Course designers, lecturers, module conveners, or any person involved with teaching at any capacity, then, should try to foster the ways in which strong, dense relationships are developed because students will inherently look for ways of developing distributes, diverse relationships.

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Unboxing the process of revision between two design-based hybrid learning interventions

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Abstract

The paper investigates the revision process of a Design-Based Research (DBR) project, in which a hybrid continuing professional development (CPD) course for educators from three higher education institutions is developed, tested and redesigned. The course runs over two cycles and is based on a key design principle, which aims at fostering inter-institutional collaboration among participants in relation to developing, testing and evaluating new learning designs in the participants' respective teaching practices.

On the basis of semi-structured interviews with the course participants, it is discussed which aspects of the course should be revised and which design strategy to apply during the revision process. Moreover, the implications for the following intervention are discussed and the redesigned course is presented.

The empirical contribution of the paper lies in the detailed unboxing of the steps taken by the research and design team in the revision process between the two cycles of the course. As such, the paper exemplifies data-informed revision processes in which the key design principle of a course is maintained, but the adaptation of it is fundamentally revised though the strategy of branching out, i.e. central aspects of the design are revised to create a new solution.

Keywords

Hybrid learning; Design-Based Research; Continuing professional development.

Introduction

Design-based intervention studies have been criticised for rarely describing the reasons as to why given aspects of an educational design solution are revised in the succeeding intervention (Zheng 2015, Gundersen 2021). This leaves the revision processes of Design-Based Research (DBR) (Barab & Squire 2004; Design-Based Research Collective 2003) in a closed box that has yet to be opened to shed light on the methodological considerations and implications related to the revision of solutions in educational design research. In this paper, we look into the revision process of a DBR project, in which a hybrid continuing professional development (CPD) course for educators is developed, tested and redesigned. The intention is to unbox the kinds of challenges and choices that educational design researchers face when engaged in revising an educational solution between interventions. In the paper, we identify three aspects of an intended intervention that can be considered for revision and point to established design activities related to either opening up the solution space (branching out) or refining existing solutions (narrowing down) as strategies that can be applied during the revision process.

The core of the article is the above-mentioned CPD course, which we describe in terms of the intended design

developed by the research and development team (the authors of the present paper) and the course participants' reactions to it after the first intervention was carried out. We then seek to transparentise the revision work carried out by the research and development team by describing their considerations during the redesign phase. Lastly, we present the intended design proposal for the next intervention in order to explicate the changes that the revision process led to. The question we seek to answer is:

When redesigning the next intervention period in a hybrid CPD course, which aspects of the proposed solution must be considered for revision, which design strategy does the empirical findings call for and what are the implications for the following intervention?

The paper is structured as follows: We first present the method used for collecting and analysing data from interviews with the course participants. Next, a hybrid CPD course for educators, titled the Double Leaning Community, is presented along with its guiding design principles. The findings from interviews with the course participants are subsequently presented. We move on to discuss the concept of revision in DBR, focusing particularly on the revision of theory, guiding principles and the adaptation of design principles. Next, we address the different strategies that can inform the revision process and discuss the difference between the strategy of narrowing down and branching. Finally, we present the redesigned course by highlighting the differences between the first and second interventions and discuss the aspect that was revised as well as the applied revision strategy.

Method

The empirical data analysed in the paper stem from a series of semi-structured interviews with nine course participants who are employed at three different HEIs in Denmark. The names of institutions and course participants are anonymised in the present study. The interviews, which were conducted in October-November 2021 after the first intervention of the course, were recorded, transcribed and subsequently coded using the coding software Dedoose. A total of eight codes that relate to the key design principle 'Fostering a double learning community' (further described below) were identified. The interview citations included in the analysis primarily address the following codes: 1) participants' interpretation of the key design principle, 2) attitudes towards inter-institutional collaboration, 3) challenges related to the enactment of the key design principle and 4) the participants' learning outcome.

The Double Learning Community

The Double Learning Community (DLC) is a continuing professional development (CPD) course that targets in-service educators from three higher education institutions (HEIs) in Denmark. During the course, the participants are engaged in (re)designing a selected number of learning designs through the integration of digital technologies. The participants are expected to take part in a double learning community (hence the name), which constitutes an inter-institutional learning community, comprising participants from the three HEIs, and a local community, comprising one or more course participants and a given number of colleagues from their home institution. Even though the course has no formal curriculum, the contents of the DLC address a set of specific learning outcomes as the participants are expected to develop knowledge and skills within three subject areas related to digital technologies: visualization, collaboration and flexible access to education. The DLC is enabled by a digital learning platform in the form of Moodle where participants can access learning materials and participate in different types of learning activities, including forum discussions with participants from other institutions and the course facilitators.

The course runs over two intervention periods from August 2021 to June 2022 and is redesigned prior to each intervention. The first intervention took place in August to November 2021 and the second intervention will take place in February to June 2022. The course participants represent different academic disciplines and they are employed at three different HEIs in Denmark, including a university, a university college and a business academy.

A hybrid learning configuration

The DLC constitutes a hybrid learning configuration, which Wals, Lans and Kupper (2012) define as a social practice focused on authentic, ill-defined tasks or challenges whose resolution relies on transboundary learning, e.g. by transcending forms of learning, disciplines and traditional structures and sectors. In this context, hybridity is not to be confused with the use of digital technologies to support learning such as flipped or blended learning. Rather, the concept of hybridity emphasises the combination and integration of elements that are traditionally considered separate to form a new hybrid in its own right. The DLC constitutes a hybrid learning configuration as

it seeks to transcend the disciplines which the course participants represent as well as the sectors they come from to foster inter-institutional collaboration and learning in relation to the use of digital technologies in education. Although there is a growing body of conceptual and empirical literature emphasising the importance of hybrid learning (e.g. Cremers et al. 2016; Ryberg, Bertel, Sørensen, Davidsen & Konnerup 2020; Hilli, Nørgård & Aaen 2019), there are few studies on the development and implementation of such configurations designed for educational staff at HEIs.

Key design principle of the DLC

One of the characteristics that sets DBR apart from other research traditions is the generation and application of design principles, i.e. generalised, domain-specific knowledge that inform educational designers of how to achieve a specific outcome (Herrington & Reeves, 2011; van den Akker, 1999; van den Akker, Gravemeijer, McKenney & Nieveen, 2006). According to Baumgartner and Bell (2002), design principles can be either explanatory, i.e. produced after an intervention has been carried out to explain why it was successful, or generative, i.e. produced before the execution of an intervention to support and guide the educational designer in generating new solutions. They suggest that both explanatory and generative design principles should be produced with three questions in mind:

- Who are the design principles for (audience)?
- When are the design principles generated (type of principle, cf. the distinction between explanatory and generative design principles)?
- What makes the design principles useful to their audience (characteristics)?

Baumgartner and Bell (2002) further argue that generative design principles should include

- Information on how and when they should be applied (procedure)
- Information on their underlying rationale (theory)
- A description of the criteria of success (outcome)

The DLC is based on the following six design principles (rendered here as titles), which have been produced with inspiration from Baumgartner and Bell (2002) as generative design principles targeting the course designers:

1. Fostering a double learning community (key design principle)
2. Encouraging problem-oriented and project-based learning
3. Utilizing the exemplary principle
4. Stimulating codified knowledge acquisition
5. Promoting learning through experimentation
6. Assisting reflective practitioners

The principles were developed by the researcher and development team prior to the first intervention. Due to the scope of the paper, we initially focus on the key design principle of the DLC (principle no. 1), which frames the DLC as a hybrid learning configuration with special focus on inter-institutional learning. The remaining five design principles serve the function of supporting the key design principle. Table 1 describes the key design principle, including its four characteristics and their respective criteria of success.

Underlying rationale	Characteristics - how to apply the principle	Criteria of success
The DLC constitutes a hybrid learning configuration (Wals, Lans and Kupper 2012; Cremers et al. 2016). The term 'double' refers to the fact that participants take part in an inter-institutional community (with peers from other HEIs) and a local community (with colleagues from their home institution).	1 You must ensure that participants from each of the three participating HEIs are enrolled	A number of participants from each HEI have completed the course
	2 You must facilitate the development of a learning community which stimulates inter-institutional and local collaboration between participants	Participants have shared and developed their teaching practice in collaboration with their inter-institutional and local communities
	3 You must facilitate learning activities that are anchored in both the inter-institutional and local learning communities	All participants have actively participated in the learning activities in their inter-institutional and local communities
	4 You must establish clear links between inter-institutional and local learning activities	The output produced by the participants illustrates the knowledge gained in their inter-institutional and local communities

Table 1: Key Design principle of the DLC - Fostering a double learning community

Adaptation of the key design principle in the first intervention

In the following, we briefly outline how each characteristic of the design principle 'Fostering a double learning community' was adapted by the course designers to the specific context in the first intervention in the autumn of 2021.

To ensure that educators from each of the three HEIs were enrolled (characteristic no. 1), the heads of department at the participating institutions were asked to select a number of course participants and a digital flyer describing the aim and contents of the course was distributed. A total of eleven participants from the three HEIs were enrolled, including six educators from a university, two from a university college and three from a business academy.

The development of a learning community that stimulates inter-institutional and local collaboration (characteristic no. 2) was facilitated through two onsite seminars: a kick-off seminar at the beginning of the course and a final seminar at the end of the course. Also, participants were given access to an online learning platform in the form of Moodle where they were encouraged to study selected reading materials and share and give feedback on their respective learning designs in an asynchronous discussion forum.

To ensure that the learning activities of the course are anchored in both the inter-institutional and local learning communities (characteristic no. 3), the course was divided into 5 design phases in which participants were asked to test in their local contexts the learning designs they had developed and subsequently share their reflections with the other course participants on the online platform.

Links between inter-institutional and local learning activities (characteristic no. 4) were established through three content themes (flexibility, collaboration and visualization), which were presented at the kick-off seminar. The reading materials and the learning designs developed by the participants were centred around one or more of the themes.

The adaptation of the key design principle in the first intervention can be illustrated as follows:

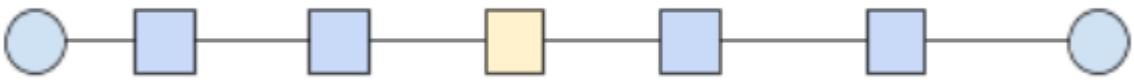

Figure 1. Legend: Square = online, circle = onsite, yellow = local, blue = inter-institutional, size = number of hours allocated to each activity.

The two circles represent the onsite kick-off seminar and the final seminar. The four blue squares represent inter-institutional collaboration, which takes place on the online platform. The yellow square represents the participants' experimentation with learning designs in their local contexts.

Empirical findings – Participants' reactions to the adaptation

In the following, we present data in the form of clustered statements from a series of semi-structured interviews with nine course participants who are employed at three different HEIs in Denmark, including a university (five informants), a university college (two informants) and a business academy (two informants). The interviews were conducted in October and November 2021 after the completion of the first intervention. The findings are discussed in the subsequent section with a particular focus on the revision of aspects related to the key design principle and its adaptation for the second intervention as well as the design strategy applied by the research and development team in the revision process.

The intention underlying the 'doubleness' is unclear

The interview data show that there is considerable variation in how participants understand the 'doubleness' of the Double Learning Community. As previously mentioned, the term 'double' refers to the fact that participants are expected to take part in an inter-institutional learning community (as established through the online platform and during the onsite seminars) and a local learning community (comprising the participants' colleagues at their home institutions). However, none of the informants seems to be aware of the underlying intention. Rather, they relate the concept of 'doubleness' to either double-loop learning (two informants), blended learning (one informant), the fusion of content and pedagogical knowledge (three informants) or the fact that the participants represent different levels of expertise in using digital technologies as either experts of novices (two informants).

Considering the confusion among the participants as to the concept of doubleness, it is tempting to discard the key design principle in the next intervention. However, several of the informants mention how they appreciated interacting with peers from other institutions during the onsite seminars. For instance, one informant describes the kick-off seminar as 'exciting' (informant F) and another found that 'an open and safe atmosphere where you could discuss your teaching experiences and ideas with the others [i.e. participants from other HEIs]' was quickly established (informant D).

Moreover, the participants generally hold a positive attitude towards inter-institutional collaboration and learning. One informant explains that he:

[...] would like people from other traditions within education [to participate]. The more minds from different locations, the more diverse perspectives we'll get on how to handle teaching situations. Other perspectives on teaching and learning will be represented. (Informant A)

Another informant argues that the participants can learn from each other across institutions because they, broadly speaking, are teaching the same target group:

We all teach students who have finished high school [...]. It's interesting to hear how students act in other contexts. It's inspiring and makes me think 'why don't my students behave like that?' Which factors cause them to act differently? What can I change in the way that I plan lessons? (Informant I)

The attitudes expressed above are echoed in varied forms throughout the interviews. Generally speaking, the informants find that their respective teaching practices share a number of similarities, which allows for them to understand the challenges that they are each facing in relation to using digital technologies in education. At the same time, they believe that their prior teaching experiences and the contexts in which they teach are also sufficiently diverse for them to learn from each other.

Lack of participation and little sharing of knowledge

The variation in how the informants understand the 'doubleness' of the Double Learning Community seems not to be rooted in a negative attitude towards the key design principle, but rather in the fact that - for a majority of the participants – inter-institutional learning and collaboration did not take place. Commenting on the relationship between the intended idea of doubleness and his actual experiences with the course, one informant explains that:

On the first day [of the course] I was given another definition: that the double refers to our collaboration with other institutions. But I haven't experienced that. (Informant C)

Several informants express similar attitudes. Their experiences are in most cases linked to the adaptation of specific characteristics of the key design principle, e.g. the adaptation of characteristic no. 2 (developing a learning community that stimulates inter-institutional and local collaboration). Although the onsite seminars were found useful for developing a learning community, the online discussion forum was not used by the participants. One informant explains that she:

[...] haven't used it at all [the online discussion forum]. I haven't exploited the potential that it might have. And there may well be potential to it. (Informant G)

Similarly, another participant explains that once the onsite kick-off seminar was completed and the online periods of the course began, she experienced that:

[...] the feeling of being part of something across institutions, it wasn't there anymore. (Informant C)

Furthermore, the adaptation of characteristic no. 4 (establishing links between inter-institutional and local learning activities) through the use of reading materials on the three content themes was unsuccessful. Both the amount and types of texts available on the platform were described as showstoppers by the participants. Asked if she had consulted the assigned literature, an informant says:

No, in fact I haven't. It didn't trigger me. I found it too peripheral and heavy, so it wasn't something I looked into. It's what I can use here and now [that interests me] because we already have… or I have… a lot to read as it is. (Informant G)

Thus, two central elements of the online platform, the discussion forum and the reading materials, did not meet the needs of the course participants, which adversely affected their engagement in the double learning community.

Feedback and experimentation considered useful

Conversely, the interview data show that the informants experienced a high learning outcome when the learning activities and feedback from the course participants and facilitators were tied closely to their experimentation with new learning designs. One informant explains that she appreciated:

[...] Exemplary learning, you know, one to one, someone who gives feedback on my problems. Or when I need new [digital] tools, someone who can show me what to do [...] That's something I can use in my daily working life. (Informant G)

Another informant gives a concrete example of how (s)he gained hands-on knowledge from another participant during the kick-off seminar:

She [a participant from another HEI] showed me how to insert a link on the Moodle platform in a different way. I used this trick and it worked just fine. So it's important to me that we focus on problem solving. (Informant H)

Along the same lines, yet another informant explains that:

The doubleness for me was when I received feedback from you and online feedback from Charlotte... and also from Anne [all course facilitators] because it gave me a whole new perspective on things. (Informant C)

Unboxing the revision process

In the following we seek to unbox our revision process with reference to the interview findings presented in the previous section. A challenge related to revision processes in DBR is the question of how to determine which aspects of a given educational design solution to revise. We argue that at least three aspects of an intended solution must be considered for revision, namely 1) the initial pedagogical theory guiding the intervention, 2) the transformation of the theory into guiding principles and 3) the adaptation of the principles in the proposed design solution.

It may be argued that the context in which the intervention takes place should also be considered for revision. However, a central characteristic of DBR is that interventions take place in messy settings and therefore researchers must take the particular context into account when designing their solution. Once a proposed design solution has been put forward it can be enacted in practice through the interactions between materials, teachers and learners (Design-Based Research Collective, 2003, p. 5). Subsequently, the enactment produces an outcome of which judgments can be made about the promise of the intervention. In relation to this, Dede (2004) questions approaches where the enactment is deemed unimportant as long as the principles of the intended design are realised. Dede warns that such interventions can easily lead to situations in which DBR presents unfalsifiable propositions, with failures always attributable to defects in implementation rather than flaws in the theory-based design itself (ibid, p. 108). Instead, Dede calls for standards for determining when to abandon suboptimal solutions, while at the same time acknowledging the complexity of generating such standards in the field of education.

Revision strategies: Narrowing down or branching out

Additionally, we suggest that researchers consider the overall purpose of their revision activities when revising the theory, the guiding principles or the adaptation of the principles of a tested solution by determining whether the analysed data call for further exploration of the solution space or refinement of a confined set of predetermined criteria. Such broad categories of design purposes can be found throughout the history of design theory, e.g. divergent and convergent thinking, also at activity level in the shape of sketching and prototyping (Buxton 2007). Sketching is a communicative activity (traditionally between designer and sketch), which is characterised by being quick, readily available, dense, self-generative, plentiful, suggestive and ambiguous (Buxton 2007; Belardi 2014). A design-based researcher immersed in the activity of sketching is thus investigating the range of possible solutions regardless of whether he is focused on revising the underlying theory, the guiding principles or the adaptation of the principles. In contrast to the purpose of sketching, Buxton argues that the activity of prototyping is linked to convergence where designers seek to refine, test and resolve specific issues in a narrower funnel of possible solutions. It is difficult to determine whether branching out or refining is the most efficient strategy for a design team to adopt at a given time of a design project. However, we argue, speaking from a research perspective, that analysis of data that stem from interventions should be a determining factor.

Data-informed revision

The informants' less positive experiences with certain elements of the Double Learning Community seems not to be rooted in a negative attitude towards the key design principle, but rather in the adaptation of the principles. What the data show is that the informants hold a positive attitude towards inter-institutional collaboration but, at the same time, they do not have the time for or are not interested in contributing to the online learning community.

Returning to the key design principle of the DLC, the participants appreciate the intention underlying the four characteristics, but they also find that the success criteria were not met. Particularly with regards to active participation (characteristic no. 3), the informants find that the principle was adapted in an unsuccessful manner. Additionally, as success criterion no. 3 was not fulfilled, the participants inevitably did not share knowledge with each other across institutions as intended (characteristic no. 2).

The data show an interest among the informants to explore the potential of receiving further immediate feedback when experimenting with new learning designs. This pointed our attention to the supporting design principles of promoting learning through experimentation (principle no. 5) and assisting reflective practitioners (principle no. 6).

Considering the above findings in relation to the two design strategies previously discussed, i.e. narrowing down versus branching out, we had the option of either refining the adaptation of the design principle or redesigning the way it was adapted. Based on the data, we have decided to impose a strategy of branching out. The fundamental criticism brought forward by the informants, especially regarding the online aspects of the course, led us to conclude that it would be insufficient to simply refine the online learning activities, including the discussion forum, and find alternative reading materials. Instead, we went back to the drawing board and sketched out several new adaptations of the key design principle. As illustrated in Figure 2 below, the design process led to a new branch of adaptation where the interaction and dialogue between the participants take place onsite, including mandatory inter-institutional observation visits, rather than online through an asynchronous discussion forum.

Adaptation of the key design principle in the second intervention

We now briefly outline how the adaptation of each characteristic of the key design principle 'Fostering a double learning community' was redesigned by the research and development team in the autumn of 2021 by using the revision strategy of branching out.

The overall recruitment strategy (characteristic no. 1) remains unchanged. However, participants are now enrolled as pairs comprising two colleagues from the same institution to strengthen local anchoring.

The second characteristic of stimulating inter-institutional and local collaboration is redesigned. The online platform is restructured to function only as a repository of shared resources. All interaction and dialogue between participants take place onsite at different campuses. Participants are required to carry out inter-institutional visits to observe and discuss experimentation with each other's learning designs.

In order to anchor the learning activities in both the inter-institutional and local learning communities (characteristic no. 3), the participants focus on designing and testing new solutions onsite in collaboration with a feedback partner from another HEI. This reduces the number of learning activities and minor cycles of the course to a few key meetings between the participants.

Lastly, the onsite visits between peers from different HEIs serve the purpose of linking inter-institutional and local learning activities (characteristic no. 4). During the onsite kick-off seminar, the participants decide which of the three content themes they would like to focus on. Subsequently, feedback partners are paired across institutions for the remainder of the course period. The intervention period ends with a final onsite seminar.

The second intervention can be visualised as follows:

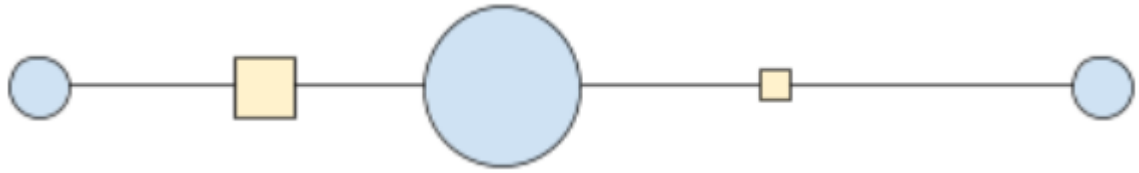

Figure 2. Legend: Square = online, circle = on-site, yellow = local, blue = inter-institutional, size = number of hours allocated to each activity.

The two small circles represent the onsite kick-off seminar and the final seminar of the course. The two yellow squares indicate the workload related to studying the course materials in the online repository. The large blue circle represents the onsite campus visits at the three HEIs.

Conclusion

The findings from the interviews with the course participants show that they hold a positive attitude towards the key design principle 'Fostering a double learning community', but the adaptation of the principle is unsuccessful as they have not experienced the intended hybridity of the course in the form of institutional collaboration. This is largely due to the fact that the participants do not have the time for or are not interested in contributing to the online learning community, which served as the primary setting for inter-institutional interaction in the first intervention. For the second intervention, the adaptation of the key design principle was redesigned through the strategy of branching out, resulting in an intended design with a greater focus on inter-institutional collaboration through onsite observation visits and cross-institutional feedback on tested learning designs.

Hence, the DDL exemplifies an intervention project in which a guiding principle remains intact, but the first and the second adaptations of said principle differ substantially. We propose that design researchers consider three aspects and two opposing strategies when revising on the back of an intervention. While our suggested list of aspects and design strategies is most likely inexhaustive, we believe that many intervention studies would benefit from unboxing their revision processes to a greater extent. Such considerations are pivotal if other interested parties are to follow the logic behind the iterative progression that characterises design-based intervention studies. Furthermore, the opposing revision strategies of branching out and narrowing down can help increase the awareness among researchers as to when to abandon suboptimal solutions and when to further increase the effectiveness of promising ones.

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Big Data in online education: Who produces value and who reaps the rewards?

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Abstract

From classifying learners to predicting learner behaviour, the application of Big Data in online education has been vast. Besides the potential benefits of Big Data in education, it is necessary to critically engage with some ethical and social challenges that Big Data presents to the field of online learning. The increasing use of big data by large institutional actors and corporations raises questions not only about data privacy and ownership, but whether this data is used to genuinely improve learner and teacher online learning experiences, or primarily for commercial profits and institutional benefits. When addressing ethical concerns regarding the use of Big Data in education, critiques often follow a reasoning that is in line with corporate interests and neoliberal logic of marketization of education. Given the importance of the pursuit for democratic online education, the need for critical perspectives in the field is ever-more essential. This research tries to critically address the role and impact of Big Data on labour relations and economic fairness in online education by examining both corporate and institutional data practices in online learning. The study puts forward a provisional theory of the use of Big Data in two large online learning platforms (Coursera and Blackboard) using critical grounded theory. The core category of Exploitation of the learning community, the three constituent concepts; the Vendor-Institutional Complex, Use of learner generated value for profit, and the Behavioral monitoring and engineering; and the sustaining category, the Magic Trick, were the foundational blocks for developing an emancipatory theory that addressed ethical issues of economic fairness regarding the use of big data in online education.

Keywords

Big Data, online education, data ethics, Coursera, Blackboard

Introduction

The rapid technological advancement in computing in the past three decades has allowed humans to quickly and efficiently gather, access, and process large quantities of information. This revolution or breakthrough in information technology is often referred to as the Big Data Revolution (Kitchin, 2014).

Just like many other industries, sciences, and areas of social life, education too, is under a mass wave of digitization and datafication. Meaning, more and more learning and teaching is done online, using software programs that run on, collect, and process massive amounts of digital data. Thus, the practices and logic of the big data revolution have also penetrated education. The aim of this study is to bring about greater conceptual clarity regarding the ethics of big data practices in education, particularly to propose a conceptual framework regarding issues relating to the use of big data, and economic fairness in online learning. Furthermore, this study aims to critically address economic fairness and labour relations in online education, in light of the big data revolution.

To conduct the study, I carried out a qualitative critical grounded theory (CGT) case study of two of the most prominent online education providers, Coursera and Blackboard. The study resulted in a provisional conceptualization of the economic model of online education in the age of big data and the ethical concerns relating to it.

In line with CGT principles and in order to stay open to emergent questions and concepts from the data, I chose to only pose one preliminary broad question that allowed me to approach the data openly and inquisitively, yet with a clear topic in mind. In the words of Glaser, this preliminary research question let me engage the initial stages of the research with the "abstract wonderment of what is going on" (1992, p.22). The first research question is as follows:

How and for what purpose is Big Data used in online education?

This question allowed me to engage with other emerging questions and problems that came to light throughout the data collection and analysis process. From the emergent questions and problems, one central research question was defined:

> *What is the role and impact of Big Data on labour relations and economic fairness in online education?*

This research question is central due to its synergistic relationship with the data and the study. On one hand, it is informed by the data and was arrived at by analysing and 'following' the patterns in the data, and on the other, it served as a guiding tool for further exploration and analysis.

Once, I reached a certain level of theoretical saturation regarding the second research question, I noticed that there were some definite conceptual and explanatory gaps in the emerging theory. More precisely, whereas a conceptualization of the economic model and logic of big data in online education was developed (or discovered), an explanation as to why and how is that model maintained, was missing. This led to the emergence of one last, new research question:

> *How is the economic model of big data in online education maintained?*

Methodology and Methods – Critical Grounded Theory

By aiming to bring about conceptual clarity, this research warrants a methodological approach that is suitable for theory building or development, rather than empirical theory testing. Thus, the grounded theory methodology (GTM) is considered most appropriate research methodology for this study due to three reasons.

1. Firstly, grounded theory seeks to generate new explanatory theories (Corbin & Strauss, 2008).
2. Secondly, the essence of grounded theory is that the theory building process is grounded in the data, and hypothesis testing is avoided (Suddaby, 2006).
3. Lastly, grounded theory is specifically appropriate for "discovery-oriented" research in areas of study that are under-theorized (Burck, 2005, p.244).

Since its initial introduction, even between the original authors, there have been multiple points of contention on how grounded theory should be done. Therefore, multiple branches of GTM have emerged and are often in dispute with one another. Namely, first is the Classical Grounded Theory, which is closest to the original methodology presented in 1967 (Glaser & Strauss, 1967); second, the Straussian model, first introduced by Corbin and Strauss (2008); third, Constructivist grounded theory, developed by Charmaz (2000); and one of the latest variants of grounded theory, Critical Grounded Theory (CGT). For this study, CGT was chosen as the most appropriate approach. Critical grounded theory is divergent from all the other variants of GTM in three aspects. Firstly, ontologically it is neither based on the post-positivist nor the constructivist paradigm, rather it aligns with the critical realist ontology. Secondly, it is concerned with creating critical, emancipatory knowledge regarding issues such as power, justice, and equality. Thirdly, it introduces retroduction as a mode of critical inquiry. The methodological principles, coding, and data analysis processes were mainly informed by Hadley (2017; 2019).

The methodological principles employed in this study are: Openness, Iteration and the Constant Comparative Method, Theoretical Sampling, Memoing, Theoretical Sampling, and Production of a Substantive Theory. The data analysis process was conducted in four steps: Open Exploration, Focused Investigation, Theoretical Construction, and Transformative Dissemination.

Research Findings and Theory Building

The research findings bring together results from the data analysis, relevant data codes, author memos, and emerging categories in order to construct a conceptual framework of 'what is going on' in the field of big data in online education, specifically relating to the critical issues regarding economic fairness and digital labour. The core category of *Exploitation of the learning community*, the constituent concepts such as; *the Vendor-Institutional Complex, Use of learner generated value for profit,* and *the Behavioral monitoring and engineering;* and the sustaining category, *the Magic Trick*, were the foundational findings that will serve as the base for the construction and presentation of the substantive theory.

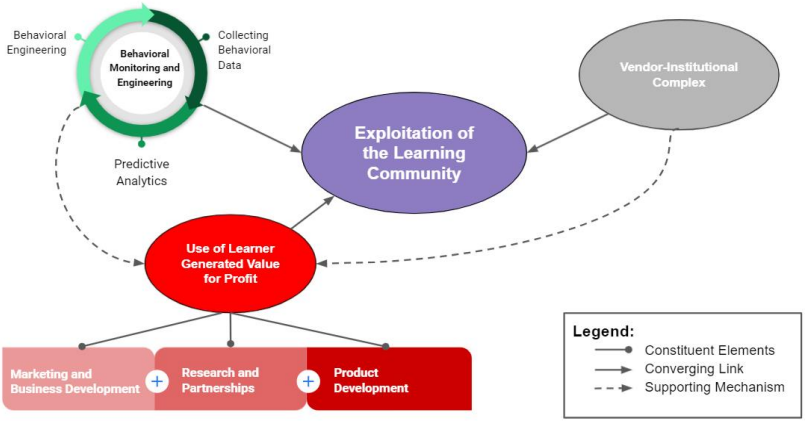

Figure 1: Theory of Exploitation of the Online Learning Community in the era of Big Data

Core Category: Exploitation of the learning community

The core category of *Exploitation of the learning community* materialised as a product of the conceptual relationships drawn between the other three surrounding concepts that emerged from the data. In other words, the Core Category is the aggregation of the three main categories or concepts. Furthermore, it is the central thesis of this research and the basis for the emergent theory.
To more clearly understand the Core Category, it is divided into two main constituent sections: Exploitation and Learning Community.

Exploitation
This section of the category addresses the question 'what is being done?', it focuses on the action or the practice of exploitation in online education. Exploitation can be defined as the action of taking an unfair advantage over someone, for one's own benefit (Stanford Encyclopaedia of Philosophy, 2016) . Since in the field of big data in online education, data is primarily used for financial gain, we can classify the exploitative data practices in online education as primarily of a commercial character. Therefore, this form of exploitation entails extracting value from vulnerable or unaware individuals and groups in an unfair way, and using this value to generate profit.
Through their data practices, policies, and actions, both Coursera and Blackboard engage in such extraction of value to secure financial gains. The extraction of the value is mainly done through the use of *learner generated data for profit.* Furthermore, what makes this extraction unfair is the *behavioural monitoring and engineering* that supports this extraction, and the *magic trick* that maintains the exploited in a state of unawareness and confusion. An example of the blend between using learner generated data for profit, and using behavioural engineering to support extraction of value by Coursera is presented in Code #78.

Data Type	Quote	Source
Key Actor: Emily Sands, VP of Data Science, Coursera 2020 Virtual Conference	"For example, our learner-product interest models determine what degrees each user sees in their browser, how degrees are ranked in her megamenu and more. These algorithms are built on deep understanding of learners from self reported features like work and education history, to behavioral features like how the learner found Coursera, what she searched for and enrolled in, and how she progressed through her learning experiences. Combined with meta-data on each degree and using as training data the conversion behaviour of the millions of other learners who have been exposed to degrees on Coursera in the past we estimate each learners interest in each program. ...This is leading to a 40% increase in degree applications through browse."	Sands, E. (2020, April). Coursera's Product Leadership Presents: Product Innovations [Product Innovation Presentation]. 2020 Coursera Virtual Conference, Mountain View, CA, United States.

Table 1: Coursera Code #78

Learning Community
Provided that Exploitation is an existing reality in the field of online education, and big data is the enabler, it is crucial to understand who are the exploited, and why. This section particularly addresses these questions. There

are different actors in the big data economy of digital learning. Namely, there are the companies such as Coursera and Blackboard, academic institutions such as universities and schools, teachers and content providers, and lastly, the learners. In the cases of Blackboard and Coursera, the companies and the academic institutions are the owners and controllers of the data, and they decide how and why the data is used and collected.
The data that the companies and institutions control is mined from the learners' activities, content and experiences. Therefore, we arrive at having two groups with a clear and distinctive difference in power and economic benefit. On one hand, we have the companies and institutions as data controllers who extract value and use it for their own benefit, and on the other, we have the learning community which is comprised of learners and instructors, whose data is being collected.
The learning community, just by existing and functioning on learning platforms such as Coursera and Blackboard, is the producer of big amounts of behavioural and learning data. As producers of such data, the learners and instructors are not compensated for the economic value they are producing, and therefore, are engaging in invisible unpaid labour. Moreover, a large learning community is both a key selling point for business partnerships and an essential competitive advantage. Thus, the learning communities are not only the uncompensated producers of data but also the products and commodities of online education platforms. Lastly, due to *behavioural monitoring and engineering*, the learning community are also the subjects in light of big data usage by educational platforms. As such, they are being manipulated, researched about, and experimented on, in order to gain business or product insights, or compel them into paying and producing more data on these platforms.

Concept 1: Use of Learner Generated Value for Profit

The *Use of Learner Generated Value for Profit* is one of the central, and first categories that emerged from the data. In its essence, it is the idea that online education providers such as Coursera and Blackboard use the data produced by the learning community for their own commercial benefit. This benefit can be segregated into three goals: *Marketing and Business Development, Research and Partnerships,* and *Product Development.*

Marketing and Business Development
Blackboard and Coursera, as the controllers of data and online education providers, are able to translate the learner-generated data into profit by extracting valuable insights that fuel their business development and marketing strategies, or in the case of Blackboard, the marketing strategies of their partner institutions. For Coursera, this can range from internal marketing efforts, such as converting non-paying learners on their platform into paying customers for a low cost of acquisition, to external behavioural advertising methods in order to attract more learners to their platform. Code #78 (Table 1), presented in the previous section is a clear example of the former.
Additionally to using user-generated value for marketing purposes, Coursera also uses learner data for the development of its business and exploring new profit-making avenues. For instance, as stated in Coursera Code #48, through learner data powered decision making Coursera informs its business development roadmap.

Data Type	Quote	Source
Key Actor: Vinod Bakthavachalam, Data Scientist at Coursera; Website Content; Blog	"At Coursera we use data to power strategic decision making, leveraging a variety of causal inference techniques to inform our product and business roadmaps"	Bakthavachalam, V. (2018, November). Controlled Regression: Quantifying the Impact of Course Quality on Learner Retention. Medium.

Table 2: Coursera Code #48

Similarly to Coursera, Blackboard also uses learner-generated data for marketing purposes and behavioral targeting and advertising. Furthermore, Blackboard also provides digital marketing data-powered services to academic institutions. The key selling point for this service is the ability to closely track learner behaviour through the enrolment marketing funnel.

Research and Partnerships
Besides marketing and business development, the learner-generated value in the form of data is also being used to conduct experiments and research in the newly established field of online education. For this purpose, learners may be shown different variations of content offerings in their courses. For Coursera, this research is often coupled with building profitable relationships with academic institutions and other business partners. Blackboard shares research data with partner institutions similarly to Coursera. However, Blackboard also uses this learning analytics

research for product innovation and development. Thus, synthesizing the general research in online education, and particular research that mostly benefits Blackboard for their product promotion and development.

Product Development

There are multiple examples of Coursera and Blackboard using user-generated data to fuel their product development and improve their products. For instance, Coursera has developed a relevancy-based algorithm for their search engine using data of over 10 million learners. This algorithm allows Coursera to show the courses and degrees that learners are most likely to enrol in and pay for. Emily Sands, VP of Data Science at Coursera explains this in Code #80.

Data Type	Quote	Source
Key Actor: Emily Sands, VP of Data Science, Coursera 2020 Virtual Conference	"We also evolved our search engine… to a relevance-based algorithm. Ranking according to what learners searching for that term ultimately went on to enrol in, pay for, and apply to. This enables learners to find the right content from among the base selection on Coursera faster powered by the search and downstream behaviour of the 10s of millions who came before."	Sands, E. (2020, April). Coursera's Product Leadership Presents: Product Innovations [Product Innovation Presentation]. 2020 Coursera Virtual Conference, Mountain View, CA, United States.

Table 3: Coursera Code #80

With the three constituent parts explained, we can move onto shortly summarising this Concept and integrating it with the existing literature. The main notion of this Concept is that value is being generated by learners in the form of data, which is then used by Coursera and Blackboard for their own profit and benefit. Furthermore, even though these companies continue to reap the financial rewards of the value generated by learners, the learners are not compensated.

This issue is largely overlooked by the scholarly work on big data in online education, nevertheless, several authors in the relevant academic literature raise similar concerns. For instance, Shum and Luckin (2019) argue that tracking and quantifying human behavioural data is a gold mine for marketers and researchers, but little is being done to improve teaching and learning. Furthermore, Williamson (2019) conceptualises the marketisation of Higher Education and the data infrastructure that surrounds it. Drawing on Srnicek (2017), Williamson brings to light the generation of value and profit from learner produced data (2019). Williamson expands on this by examining the market-making practices in digital platforms in Higher Education, particularly the case of Pearson (2021). Lastly, relating to the Research and Partnerships segment of this concept, Marshall (2014), brings up concerns regarding the experimentation on learners using untested pedagogical practices on the EdX online education platform.

Concept 2: Behavioral monitoring and Engineering

If the first concept discussed in this paper addressed the unfair use of data in online education, the concept of *Behavioral Monitoring and Engineering* pertains to the unfair extraction of data. Behavioural data is the data gathered by tracking and monitoring the actions and experiences of learners, such as how long do learners spend on certain pages, where do they click, what actions do they perform before paying for a course, once enrolled in the course, what steps do they take before dropping out or successfully finishing etc. Therefore, behavioural data is of central value for online education providers. Blackboard and Coursera use behavioural data for two distinct purposes. Firstly, behavioural data is used to predict and improve what is deemed to be learner success, and secondly for commercial purposes, such as influencing a learner to pay for a certificate or enrol in a degree.

The Behavioral Monitoring and Engineering process is split into three steps. First, it starts by collecting the behavioural data. Secondly, predictive analytics are used to predict future behaviour, such as the likelihood of dropping out, or not finishing a course. Lastly, it ends by intervening in order to alter unwanted future behaviour for the benefit of the company, institution, or the learner.

Predictive analytics is the practice of using large historic behavioural data sets to train algorithmic models which then predict the behaviour of learners. Put simply, in order to make predictions about a current, individual learner, these models reflect on how similar learners with similar past experiences behaved. For instance, Coursera may use an algorithmic model to predict whether a learner is likely to pay for a certificate at the end of the course based on their performance and behavioural data and the performance and behavioural data of millions of other past learners in that course.

Besides predicting human behaviour, Coursera and Blackboard use big data to alter it by the use of targeted communication and nudges, visual modification and recommendation models, and advertisements. Targeted communications and nudges are automated messages and notifications that aim at intervening in and altering

human behaviour. This method has the simplest underlying model of behavioural control, since it largely relies on verbal or textual communication. However, the structure behind when, where and how are these messages and notifications sent, is incredibly complex and based on large amounts of data and computational analytics. Some messages aim at altering behaviour in order to improve learner success and the learning experience. However, others, aim at compelling students towards enrolling and paying for online degrees, certified programs or similar paid content.

Furthermore, another mode of behavioural engineering is the visual modification and recommendation models. Often, this mode is also named 'Personalisation of Content'. I will not use this terminology, since I believe it falsely represents the practice of modifying content for commercial benefit as an attempt for personalisation and improvement of the learner's personal learning journey. Through content modifications and recommendations informed by big data, companies such as Coursera can control what the learners see, and do not see. Consequently, learners might enrol in a degree that is just simply made more visible to them, rather than taking their own, personal learning path.

Many works in the contemporary scholarly literature deal with behavioural data in online education (Kizilcec et al., 2020; Qiu et al., 2016; Tseng et al., 2016; Wassan, 2015). However, critical perspectives on the use of behavioural data in the field are rare (Regan & Jesse, 2018; Reidenberg & Schaub 2018). Firstly, Reidenberg & Schaub (2018) raise concerns over the increase in learner stress, knowing that their steps are being watched and surveilled. Moreover, they further note the danger of the use of learner behavioural data for manipulation outside of the learning context, for commercial purposes. Similar to the findings in this study, Regan and Jesse (2018) find the ethical issues of nudging problematic in certain circumstances, especially in the field of education. They argue that these nudges must be transparent and promote social welfare, rather than become tools of manipulation for commercial benefit. The findings of this study are further supported by Yeung (2017), arguing that by using nudges companies become "choice architects" and have the power to alter human behaviour in a predictable way.

Moreover, ethical concerns regarding the use of behavioural data are being raised in the broader literature on big data, as well, especially in the fields of information systems and economics (Herschel & Miori, 2017; Newell & Marabelli, 2015; Zuboff, 2015; Zuboff, 2019). For instance, Newell & Marabelli (2015), uncover the falsely portrayed 'free access' to information on the internet, arguing that in fact, large tech companies have control over what we see and access. They further argue that this control over what the user sees leads to a slow and subtle manipulation of the user's worldview.

Concept 3: The Vendor-Industrial Complex

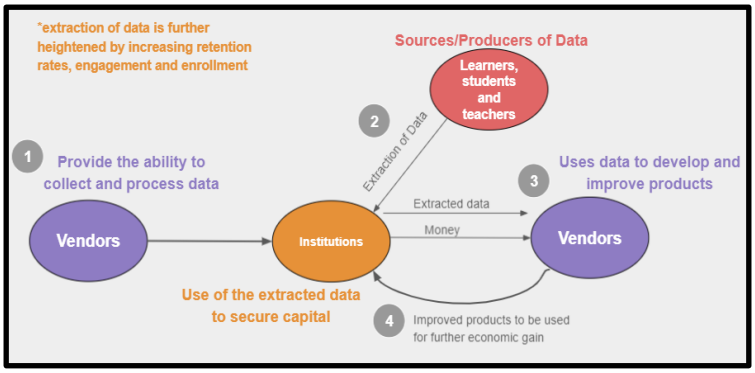

Figure 2: The Vendor Industrial Complex

The title of the Vendor-Institutional Complex concept is partially inspired by the existence of other industrial complexes such as the Military-Industrial complex, or the Prison-Industrial Complex. It captures how institutions, in this case, academic ones, reconstruct their relationship with industrial enterprises in accordance with capitalist and neoliberal models with the aim of financial growth.

In online education, institutions and vendors (such as Blackboard and Coursera), as owners and controllers of the data, have a shared, vested economic interest in extracting data from learners and benefiting from the free labour that the producers of data provide. Therefore, their relationship forms an economic model that is based on and aimed towards the extraction of value from the data students and teachers produce. Even though both Blackboard and Coursera are engaged in the Vendor-Institutional Complex by partnering with universities and other academic

institutions, there is much richer data explaining Blackboard's involvement in such relationships with their institutional partners.
In order to more clearly understand the Vendor-Industrial Complex, Figure 2 presents a diagram that I created during the Theoretical Construction stage. I will further explain this diagram by listing the four main steps in the cyclical process of the Vendor-Institutional Complex.
As seen in the diagram above, the Vendor-Institutional Complex has four main stages or steps.

1 Firstly, the vendors, in this case, Blackboard, provide the ability for institutions to collect and process data *en masse*. This practice is called the productization of data collection and processing.
2 Academic Institutions extract data from students and teachers, who are seen as the mere producers or sources of data. Once the data is extracted, institutions use this data to gain value and secure economic gains. The data can be used for commercial purposes such as cutting costs, retaining students, or improving administrative efficiency, or informing digital marketing strategies.
3 Following the extraction of value, institutions share the extracted data with the vendors and provide them with payment for their services. In turn, Vendors use this data and resources to further develop and improve their products.
4 Lastly, these improved or newly developed products and services are sold to academic institutions, which are then used for further data extraction, economic gain, and cost-cutting.

Finally, it is important to note the cyclical and reproductive nature of the Vendor-Industrial Complex. The increased efficiency of data practices and improved retention and enrolment rates lead to further data extraction from a larger pool of learners and teachers, or in other words producers of data.
The Vendor-Institutional Complex is a novel conceptualisation and to my best knowledge, does not relate to any of the previous literature. For instance, Reyes (2015), completely excludes vendors and online education platforms as stakeholders that benefit from big data in online education. Furthermore, Selwyn (2014) provides a critical perspective of the 'digital university', arguing the emphasis on neoliberal logic by educational key actors such as policymakers and influencers. However, Selwyn does not explore the role of vendors and private companies in the process of building the digital university (2014). Therefore, critical scholarly work focusing on the relationship between academic institutions and commercial vendors is quite limited, and further work exploring the vendor-institutional complex is needed.

Sustaining Category: The Magic Trick

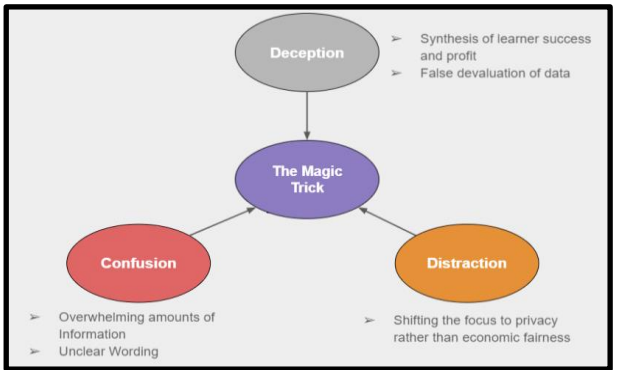

Figure 3: Sustaining Category – the Magic Trick

The Magic Trick category emerged by asking "what must be true for the exploitation of the learning community to be taking place, and how is this model maintained?". One of the reasons for this inquiry was because I was confused by the fact that individuals and groups within the learning community are not massively protesting this exploitation.
Upon further data collection and analysis, I arrived at two emerging possibilities. One, the learning community is comfortable with and consensual to the big data practices and the logic underlying them. Two, there is a lack of informed knowledge about the exploitative practices, and these are being hidden from their awareness. The first possibility has some minimal supporting evidence, that suggests that students were comfortable with being contacted based on the use of learning analytics. However, the students were not informed about what information

was collected and how they were tracked, and the research was conducted by Blackboard. Furthermore, supporting evidence for the second possibility is overwhelmingly more voluminous.
The name of the concept, Magic Trick, comes from the three different methods used to conceal the exploitative practices of Blackboard and Coursera. In other words, the learning community is tricked into unawareness. Any good magician uses three basic methods to pull off a magic trick; confusion, distraction, and deception. Similarly, these practices are also present in the Magic Trick that big data based online education vendors are playing on the learning community.

Confusion
When magicians perform a trick, they might employ a tactic of overwhelming the subjects with too much information or simply performing a plethora of movements and actions so that the subject is left confused. Confusing and overwhelming the audience is one way of covering what the magician is really doing.
Coursera and Blackboard, virtually employ that same tactic of confusion, by presenting the audience with overwhelming amounts of information that is often unclear, and that is incredibly difficult to navigate. For instance, Memo #29, presents an observation made about the time and effort it takes to go through all the information needed for one to understand how their data is used. Namely, one user needs to go over approximately 100 pages of highly technical text.

Memo #29
Through my data collection and analysis work, I have come to realize how much time and effort is actually needed to clearly understand how Blackboard and Coursera are using learner-generated data. For instance, in the case of Blackboard, one must go through over 50,000 words of text (privacy statements, terms and conditions of use, third party statements etc.), and that is not including the privacy policies and statements of the academic institutions and some smaller third-party partners, who also use user-generated data on Blackboard.

Table 4: Memo #29

Moreover, it's not only that the amount of text is overwhelming, but the wording in the privacy statements and documents is often incomplete and unclear, leaving open possibilities for further exploitation. This unclear wording, when communicating the collection of data from learners often includes phrases such as "among other things" or, "any other data that is generated by you", setting no boundaries to what data can be collected and for what purposes.
Additionally to the overwhelming and unclear information provided to learners by Coursera and Blackboard, learners must also go through the data policies of third-party partners and policies based on local laws and regulations. For instance, one of Blackboard and Coursera's largest partners is Amazon Web Services (AWS), they use learner-generated data on Blackboard and Coursera to train their machine learning algorithms (e.g. algorithms for natural language processing, facial recognition etc.).

Distraction
Often, a magician will want to shift their subject's focus away from what is really important, the trick. They do this by distracting the audience by presenting a dummy point of attention, or a decoy. Unlike economic fairness, safeguarding privacy does not challenge the logic behind the commercial value generation from big data in online education. After all, the financial gains in online education are not made by monetising personally identifiable information, but by productizing and marketizing big data sets and data analysis tools. Therefore, shifting the focus of ethical concern away from the economic exploitation in the field is achieved by paying and driving special attention to privacy. In this study, I have recorded twelve codes where privacy concerns have been addressed by Coursera and Blackboard, however, none addressing concerns over economic fairness and data exploitation. This overwhelming focus on privacy is also translated in the academic literature, where most of the work on big data ethics in online education is focused on privacy issues (Chen & Liu, 2015; Fischer et al., 2020; Johnson, 2014; Prinsloo & Slade, 2017; Reidenberg & Schaub, 2018; Wang, 2016; Williamson, 2017).
Deception
The last and the most central step of any magic trick is *Deception.* It is the act of leading someone to accept a false truth, or in other words, the act of hiding the truth under a veil of falsehood. Relating to this phenomenon, a peculiar category emerged from the data I collected on Blackboard and Coursera; the synthesis of learner success and commercial gain. Namely, both companies marry learner success with their financial success and the financial success of their partners. This way, Blackboard and Coursera can exploit learner's data by falsely claiming that it is the learner's success that they have in mind, not profit.

An additional category that might be relevant to the phenomenon of *Deception* is the devaluation of data. By arguing that data must first be analysed, refined and cleaned before it is valuable, key actors at Blackboard and Coursera are assigning no value to the raw data that is generated by the learning community. This way, the extraction of learner data will not be perceived as economically unfair, or as exploitation, since these companies are not extracting anything of direct commercial value.

Summary, limitations and final remarks

The findings in this study presented the emergence of a core category, three main concepts and one sustaining category. These main elements and the relationships between them compose the Theory of Exploitation of the Online Learning Community in the era of Big Data. The theory explains the purpose and role of Big Data in creating and maintaining the economic model and labour relationships in the field of online education. Being critical in nature, the theory particularly raises concerns regarding economic fairness and labour exploitation. Furthermore, by incorporating the sustaining category of the Magic Trick, the theory further explains how the economic model and exploitation are maintained. Figure 1 illustrates an overview of the theory. The sustaining category of the Magic Trick is not included in the illustration since the Magic Trick is the invisible background on which the relationships between the concepts and the core category play out.

By looking at the legend in Figure 1, one can notice that there are three types of relationships; constituent elements, converging links, and supporting mechanisms. The first one relates to the elements that constitute a certain concept. For instance, predictive analytics is a constituent element of the concept Behavioral Monitoring and Engineering. The converging links represent the convergence of the concepts into the Core Category. In other words, when the main three concepts are united, the core category of Exploitation of the Learning Community emerges. Each of the three concepts play a part in explaining how and why the learning community is unfairly exploited. Lastly, the supportive mechanism links represent relationships where one concept supports the existence of the processes in another. For example, the Collection and Engineering of Behavioural Data supports the Use of Learner Generated Value for marketing and business development purposes. These constituent elements of Concept 2 provide the necessary mechanisms for the materialisation of the processes in Concept 1.

Implications for Networked Learning (NL)

The findings in this paper also have some important implications and insights for the field of NL. Namely, the research focused on platforms that enable "connections between individuals, learning materials, and learning community" (Rodríguez-Illera et al., 2021), and digital spaces in which networked learning happens. Therefore, this paper provides critical insights into the platform commercialisation and commodification of these connections by extracting, storing and analysing valuable data from learning networks in these spaces. In the field of NL, more recently, there have been growing number of concerns expressed regarding the ethical implications of using commercial platforms as spaces for learning (Rodríguez-Illera et al., 2021). Expanding on these, this paper presents a critical investigation into the economical fairness of the use of big data practices in some of the most current and popular online spaces and platforms for networked learning.

Limitations

Besides some methodological limitations of CGT, there are other, theoretical limitations that demand consideration. Firstly, including only two case studies as the focus for the study, the knowledge and the theory that emerged is local and narrow in context. Therefore, the emergent theory is not, and it does not aim or claim to be generalizable, limiting the applicability of the theory to different contexts. However, as previously mentioned, the theory is modifiable and open for adaptations and comparisons with contexts, different from the one studied.

Secondly, other than my personal experiences and observations, the theory does not include the experiences and knowledge from main actors in the field such as learners, teachers, and employees in online education companies. Dealing with particular themes such as exploitation and deception, these perspectives are crucial for the development of a holistic theory.

Lastly, besides offering a conceptual map that provides opportunities for social change and anti-hegemonic action, the theory and the study itself do not present viable solutions and potential avenues for action. Therefore, this is only a preliminary study and further work is needed.

Concluding Remarks

Before finishing this work, I would like to present one last remark regarding the tone and intent of the study. When reading this work, and interpreting the emergent theory, one might falsely assume that I am criticizing the use of

big data in online education as a whole, or that I am advocating against the use of these technologies. However, what I aim at critiquing and advocating against is the underlying, exploitative logic behind the use of big data in online education. Big data, learning analytics and artificial intelligence as technologies have huge potential to be beneficial for both learners, teachers, and educational institutions. However, for these benefits to materialize, the priority when using them should be the wellbeing and flourishment of learners and improving the learning experience, not commercial goals and financial gains.

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Designing for the materialization of networked learning spaces

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Abstract

The potential of a Networked Learning (NL) space comes into being when participants establish communication, build connections among each other, and create a dialogic space. Moving from this premise, this article poses a complex question: How to design for the materialization of a NL space? It bases its theoretical framework on Bakhtin's idea of centrifugal and centripetal forces, the concepts of network core and periphery, as well as the idea of the strength of weak ties. Through these lenses, the article presents a cross-case analysis of two projects aiming at technology education in Denmark. Forces, connections, and movements are exposed and analyzed, showing the importance of unstructured communication processes that nurture a networked community. These results lead to new speculations for future educational design of NL spaces.

Keywords

Networked Learning; Centrifugal and centripetal forces; Core and periphery; Connections; Dialogue.

Introduction

The long-standing concept of Networked Learning (Goodyear et al. 2004) has faced a recent collective redefinition towards a more situated sensibility, a broader conceptualization of cognition, and the acknowledgment of the 'messiness' that characterizes learning processes (NLEC et al., 2021). The critical and emancipatory roots of Networked Learning (NL) have expanded to include socio-technical, sociomaterial, postdigital, and postphenomenological perspectives. In this effort of reconceptualization, it is stressed how learning is a complex, emergent, and holistic process that appears inseparable from the surrounding environment, while the network can be considered an assemblage of actors and organizations where agency is distributed and decentralized. On these grounds, it is crucial to understand how the connected actors taking part in a network can create a space for NL or, in other words, how their agency materializes in a specific, situated, and unique space-time (Orlikowski, 2007).

Thestrup et al. (2018) suggest that a NL space comes into being when participants become aware of the potential of NL, establish communication, and build "experimenting communities" (NLEC et al., 2021, p. 21). In this sense, a NL space is a dynamic ecosystem (Miranda and Pischetola, 2020) where participants take responsibility for their own learning while navigating the network multiple dimensions and layers (Blaschke et al., 2021). Thus, a NL space is first and foremost a relational space (Jones, 2004; Jones et al., 2008), that is, made of elements and the relations between them (Mol and Law, 1994). Yet, a NL space escapes formal structures (Fawns, 2019) and cannot be conceived as stabilized through a set of well-identified nodes (Lamb and Ross, 2021), as its fluidity is essential to nurture the network itself. Bearing this in mind, this article poses a complex question: *How to design for the materialization of a NL space?*

In the attempt to answer this question, the paper moves from the analysis of the dynamics that characterize the formation of a NL space and explores the forces at work in networked dialogic processes. It embraces Bakhtin's concept of centrifugal and centripetal forces (Bakhtin, 1986) and the concepts of network core and periphery (Dahlander and Frederiksen, 2012), as well as the idea of strong and weak ties (Granovetter, 1973). These concepts can easily be placed in a dualistic relationship to each other with the centripetal, the core and the strong ties on one hand, and the centrifugal, the periphery and the weak ties on the other. A dichotomy that calls for a choice – a choice of what is better, more useful, more effective in relation to learning. However, we believe that in a networked perspective – when the aim is to create new knowledge, instigate political discussions and social change – it is not a question of choosing, but a question of finding a way to *move between* these two kinds of 'beings' or positions in the network. In fact, in line with the reconceptualization of NL, we defend that it is in the movement between the nodes that the energy is created, and the potential of change is situated.
Building on these theoretical grounds, we present two cases of design for the materialization of a NL space and examine their potential for the creation of living, experimenting communities of networked learners. Ultimately, the paper seeks a concrete way to put NL to work, by strongly intertwining theory and practice (Mazzei, 2017), as the authors themselves are sharing experiences of creating a long-standing NL space for education professionals in Denmark.

Materializing a NL space: forces, movements, and connections

In the NL tradition, dialogic communication has often been highlighted as the main element for the establishment of connections among the nodes (Goodyear et al., 2004; Hodgson and Watland 2004; McConnell et al., 2012). However, despite the well accepted idea that the construction of knowledge is a socially negotiated activity, in educational settings dialogue can also be seen in an instrumental way and narrowed down to a tool (Mishra, 2015; Pischetola and Dirckinck Holmfeld, 2021), rather than understood as a necessary condition for any human relationship (Matusov, 2011). This has also been among the critical aspects that raised the need for redefining NL in first place (NLEC, 2021).

In this paper, we embrace the theoretical perspective of Bakhtin on dialogue, understanding its material power (Hetherington and Wegerif, 2018; Naumann and Pischetola, 2017) for the creation of NL spaces. In fact, a Bakhtinian perspective on dialogic communication can help us analyze the forces at work in this materialization, and discuss the value of any types of relationships, including those between people and resources (Jones et al., 2008) and those that have been defined as 'weak ties' in literature (Granovetter, 1973). Moreover, Bakhtin's perspective can support us to explore how different forces *move* within the network, between the core and the periphery and in the constant recombination of participants' roles and positions (Dahlander and Frederiksen, 2012).

Centripetal and centrifugal forces: creating meaning

According to Bakhtin (1986), dialogue is shaped both by *centripetal* and *centrifugal* forces, or 'official' and 'unofficial' forces (Mishra, 2015). Centripetal forces tend towards discipline, regulation, and a fixed order. They work for unification, homologation and monologism (Matusov, 2011). They consider authority as absolute and unquestionable. Centrifugal forces seek constant transformation and thus lead towards chaos, or 'laissez faire' (Elden, 2007), and they might "open the pathway for ideological becoming" (Mishra, 2015, p. 79), as they comprise more than one unified truth about the world. In this sense, centrifugal forces challenge established authority and fixed societal assumptions.

In an educational perspective, the result of the encounter between centripetal and centrifugal forces is the development of an individual and self-authored voice (Bakhtin, 1986). The movement between these forces also has a relationship to the creation of meaning in time. Bakhtin argues that an utterance made in the present is always related to utterances made in the past. In this sense, every utterance carries with it some traces of history –of previous meanings of the sign and the signified, of the word and of that what it tries to describe. At the same time, an utterance is also always connected to the future, as every utterance contains the seeds for future utterances. If we accept Bakhtin's idea that our utterances contain the past, the present and the future, it becomes relevant for the materialization of a NL space to bring together people from different contexts, as they will all come with different pasts embedded in their present utterance and therefore also different contribution for the future shape of this space and the related outside networks of the participants. Any communicative act is interdependent with other communicative acts and dialogic communication is thus "an opening of a difference that is the source of meaning" (Wegerif, 2011, p. 9). Difference enables pluralism in the current/future dialogue, and it allows for a fruitful exchange between unifying and divergent forces.

Movements between core and periphery: making space for innovation

Individuals mutually constitute each other, as through dialogue they build meaning and knowledge, also about themselves (Bakhtin, 1986). This view is in line with a relational understanding of networks, where the individuals acquire an identity in a context, depending on the position they occupy in the network (Jones et al., 2008).

According to Dahlander and Frederiksen (2012, p. 989), a person's position in the network "can range on a continuum from core to peripheral". Individuals positioned at the core are more likely to gain credit, recognition, and credibility for their ideas, which mobilize resources (Hargadon, 2005). However, they also need to conform to an established system of beliefs, norms, and ways of thinking. An institutional framework could be considered in this way, as a core of an established set of relationships, standards, and practices (Cattani et al., 2014). In this sense, we understand the core as strongly connected to centripetal and homogenizing forces in the network. In the perspective of this work, we understand the core as the university, or the stable node.
On the other hand, a position closer to the network periphery allows people to explore practices and ideas that the core members might have ignored. In fact, the periphery members – called cosmopolitans' by Dahlander and Frederiksen (2012) – are also taking part in other communities, which are external to the network, and they "transfer, translate, and transform experiences from one community to another" (ibid, p. 990). In contrast to the core members, the cosmopolitans might experience more heterogeneous practices and alternative ways of thinking. The centrifugal forces are at work here at the boundaries of the network, towards divergent ideas and innovation.

In our understanding, a NL space materializes when the core members support cosmopolitans' insights and their movement within the continuum core/periphery. In a NL space, knowledge construction is in constant evolution, and so is its own conceptualization (NLEC et al., 2021).

Connections as constellations of ties: giving value to knowledge creation

In a NL perspective, it becomes important that educational settings – seen as knowledge-creating contexts – bring people together in new networked constellations. However, it is not clear how these constellations are built, or how they come to being.
In the attempt to find a bridge between micro-level interactions and macro-level patterns of networks, Granovetter (1973) characterized the strength of interpersonal ties through four key elements: amount of time dedicated to the interaction; emotional intensity of the exchange; intimacy; and reciprocal services. According to his analysis, "weak ties are more likely to link members of *different* small groups than are strong ones, which tend to be concentrated within particular groups" (Granovetter, 1973, p. 1376). The major implication of these findings, the author concludes, is that individuals' experience is tied-up with larger social structures: weak ties, often dismissed as irrelevant in sociological theory, are the connections that mostly provide integration into communities and local cohesion.
Four decades after this theoretical contribution, Jones et al. (2008) have applied this model to virtual networks, finding the strength of weak ties even more relevant for the materialization of hybrid NL spaces.

In the following, we will through examples explore and discuss what materializes a NL space emphasizing three aspects, related to forces, movements, and connections, respectively: (1) shared meaning making through dialogues shaped both by *centripetal* and *centrifugal* forces; (2) space for innovation through movements between *core* and *periphery;* (3) value of knowledge exchange and knowledge creation in the dynamics that acknowledge the strength of weak ties.

Research methods

The methodological approach presented in this paper is structured around a cross-case model of analysis. Khan and VanWynsberghe (2008) propose that mobilization of new knowledge occurs when studying different cases at the same time. According to Byrne (2005), a comparative method of analysis is well suited to explain the complexity of a phenomenon, and it also has the potential to contribute to reshaping the investigative tools in human and social sciences. Particularly, case-based methods can offer us "a new way of seeing how things have come to be" (Byrne, 2005, p. 101), that is, their process of materialization. This idea recalls the dialogic space theorized by Wegerif (2011), which understands knowledge as the result of the clash between different perspectives, seen from both the outside and the inside. In a cross-case analysis, we are operating with the same principles of dialogic and relational theories: we are looking at the *relationship* between the cases, rather than considering the studies as separate parts, or comparing/contrasting their results.

In a review of cross-case analysis approaches, Khan and VanWynsberghe (2008) divide them in two main categories: (1) a variable-oriented approach, where similar factors are used to evaluate both cases independently before comparing them; and (2) a case-oriented approach, where similar processes are highlighted in diverse sets of studies. The latter "can show how a story unfolded in different cases, how researchers can make sense of the original case, or suggest new typologies, classes or families of a social phenomenon" (Khan and VanWynsberghe, 2008, p. 9). A key strength of a case-oriented approach, say Rihoux and Lobe (2009), is that it is a holistic approach, meaning that it does consider each case in its complexity, considering all different combinations of conditions that can produce a certain outcome. It also forces researchers to justify their choices from a theoretical perspective, with additional observable implications than the original one-case analysis (Beach and Rohlfing, 2018). In this sense, it proves to be an interesting methodology for the purposes of this paper.

It is important to underline that the authors of this article have come together in a shared interest in digital technology and learning. We are all involved in the two cases presented, as teachers, educational designers, researchers, and managers. This constellation has a strength in that we are all internal observers of the two cases described, but we also provide and outside-in view to each other's project. In this sense, we are trying to create our small NL space, through the cross-case analysis that follows.

Case studies

The format we choose to report the two cases of this study is the one of a narrative based on participants' observations during workshop activities and qualitative interviews. The two cases examine the importance of combining centripetal/centrifugal forces and their movement between the core and the periphery for the emergence of a strength among weak ties in these spaces. By exploring the enaction of these concepts in existing NL spaces, they try to address the research question: *How to design for the materialization of a networked learning space?* The cross-case analysis is built around the scoping of both interventions: building NL spaces that aim at professional development.

Case 1: Master in ICT and Learning (MIL)

Master in ICT and Learning (MIL) is a two-year, 60 ECTS, part-time continuing adult education established in 2000 as a collaboration between four universities in Denmark: Aalborg University, Aarhus University, Copenhagen Business School, and Roskilde University. Over the years MIL has produced more than 450 masters and more than a thousand students have participated in its modules[6].

In this paper we will describe a six-week, 5 ECTS, elective discipline which is offered in the Spring of 2022. The elective is called 'Leadership, education and technologies - Post COVID-19'. The course is aimed at managers and executives in the educational sector with an interest in the interplay between technologies, organizational learning, and pedagogical development. The elective is organized as a mix of physical, online and hybrid participation and individual fieldwork. The assessment criterium is pass/no pass based on an uploaded portfolio documenting the students work and learning throughout the elective subject.

Over the years, technological development has been fast, and technologies are no longer nice-to-have in an educational context, but more and less a prerequisite. A development that the COVID-19 lockdown has fueled, as educators and educational institutions have gained massive experience with teaching with and in technologies. This development calls for practitioners who cannot only use and design with technologies – but also feel empowered to instigate and facilitate critical discussion about the access and use of technologies in education, as well as what we want future technologies to enable. Discussions that need to take place at all levels and in all corners of the educational system.
A total of 17 students have signed up for the elective. They come from different types of educational institutions and agencies, high schools, business-, health, agriculture and university colleges. Some are leaders and head teachers, and others are teachers, 12 women and five men. Some take this elective as part of their master in MIL, while others only join this elective.
The development and execution of the module is done by three teachers with a shared interest in MIL, in common theoretical frameworks, and in researching and teaching the theme of the module. Two of the teachers have experience as leaders. The elective is designed as a collaborative exploration of the influence of digital technologies in educational organizations and how to manage that. In the design, centripetal and centrifugal forces are used to enable the participants to move between multi-voiced processes, that will allow them to identify,

[6] For a full description of the program, see https://www.aau.dk/uddannelser/efteruddannelse/master/ikt-laering

challenge and develop a self-authored voice in relation to the interplay between leadership, education, and technologies. A voice that can be used in their home organizations as well as in the discussions with the educational sector as a whole.

The figure beneath (Figure 1) illustrates how there is a designed intention for movements between the forces during the course: centripetal – where the lines of the square meet or cross – and centrifugal – where the lines vertically are furthest part.

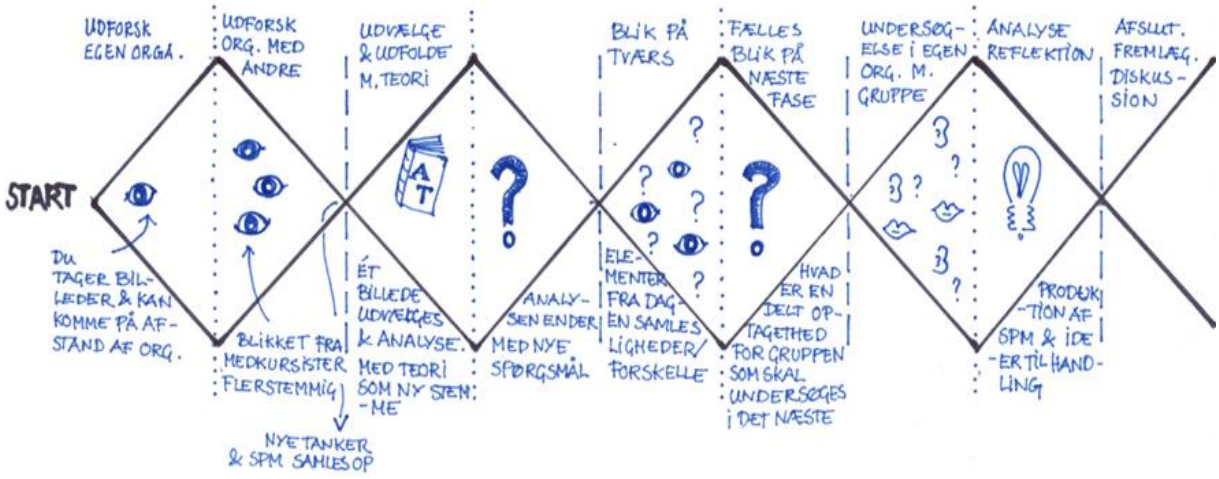

Figure 1: Design for movements between centripetal and centrifugal forces during the course

In the following, we will describe how the design enables connections, centripetal and centrifugal processes as well as movements.

The first day at the module

The first day at the module takes place as a physical meeting from 10 am to 3.30 pm at Aalborg University, Copenhagen. Bringing 17 people together from different parts of the country and different educational organizations is an example of the course design's centripetal force, as they are all there because they share an interest in the theme.

During the first course day the participants are taken through several centripetal and centrifugal movements.

As preparation, the participants are asked to produce and bring with them 30-40 printed photos of technologies in their home organization. The assignment is given with the idea of starting a centripetal process where the participants focus is pointed in the same direction, which allows for the creation of a shared material. This material is then used at the seminar to instigate a centrifugal process, where the richness of the pictures is unfolded as the participants are asked to share, introduce and discuss their pictures, in groups of 3-4 people.

A process where the participants examines the different organizations, technologies and processes represented in the pictures and how their personal understanding of the same has guided their work when taking the pictures. This way of starting the module enables a collective discussion where the initial individual view of the participants is challenged by the pictures and perspectives of others and the participants together start to form a multifocal interpretation of the course theme.

After having explored each other's pictures and discussed their initial meaning, students are asked to interpret the pictures using a presented theory. At first this creates a centripetal force as all participants are united around discussing their data from a certain theoretical point of view. Secondly, it also allows a centrifugal force to come into play, as using the theory opens several new perspectives, questions and discussions related to the data and the participants' understanding of their organizational reality represented by the pictures.

At the end of the seminar the participants are asked to bring the analysis and reflections from the day together in a centripetal process of formulating a 'research question' that can guide their work for the coming six weeks of the course.

The six-week online period

After the initial physical seminar, the course continues online with a mix of online seminars for the participants as a whole and work in the groups supported by a supervisor.

During the first two weeks of the online period, the participants are asked to interview actors in their home organizations, with the aim of creating a new centrifugal process that will allow the encounter of more and various voices.
After creating data in the home organizations, the participants will enter into a period of analyzing, discussing and reflecting on their collective material (pictures, theory and interview data), with the aim of bringing the many and diverse voices present in the material together –a centripetal movement leading to new findings, understandings, questions and muddles related to the interplay between leadership, education and technologies.

The final presentation and beyond
At the end of the course, the participants will present and discuss their group work. The participants are asked to produce a text that (if they prefer to) can be posted on the social network LinkedIn. The goal of the post is to disseminate to others outside the course the understandings and questions that the participants have produced during the course, as well as the discussion points that they would like the Danish educational sector to put on the agenda. The aim is not only to instigate a dialogue with the network of participants, but also to facilitate a discussion between the participant and the larger network of actors in the educational sector.

The NL space at MIL

The following quotes are excerpts from the participants oral reflections on their learnings at the end of the first course day. As the course is not yet completed as this paper is written, a final evaluation has not yet been made, but the quotes give an impression of the participants' very first reflections.

> *I discovered that we share some of the same questions across organizations, but that we have different views on those common problems, in the groups.*
>
> *I would like to have the employees take pictures. I would like to understand the problem in new ways, see more problems.*
>
> *What I believed to be the 'problem' is maybe not really the 'problem'. The anthropological approach forced me to move my focus and recognize the organization.*

To us (the authors), these quotes reflect how the participants have realized working with both centripetal and centrifugal forces can open their eyes to new insights and learning. They recognize the force of moving between the centripetal and the centrifugal when they see the theory as a helper in identifying problems, when they realize that sharing their individual pictures leads to identifying shared problems, when they think of having employees take pictures as a way to identify new problems and new understandings of the problems, when they realize that they as leaders are not capable of defining the problems alone, but they need the voice of others and thereby feel the need to recognize the need to move focus away from their own point of view to recognize the organization and its many points of views.

Case 2: Teknosofikum

Teknosofikum is a three-year project (2020-2023) funded by the Danish Ministry of Higher Education and Science as a follow-up of the national action plan in higher education "Digital Competences and Digital Learning" (UFM, 2019). The plan emphasizes the need for teachers to understand digital technologies in a critical way and with ethical considerations, which will drive their teaching practices in all disciplines and subjects. The goal of the project is to develop a 37-hour blended professional course in technology education for higher education teachers. Four institutions work collaboratively at this task: IT University of Copenhagen, Royal Danish Academy of Architecture, Design, Conservation, Design School Kolding, and University of Copenhagen - Faculty of Law[7].

At the moment of this writing, Teknosofikum has undergone a first mini-trial online in May 2021 with 7 participants and a second blended trial in November 2021 with 22 participants from the four partner institutions. The mini-trial lasted one week, while the second trial lasted six weeks. The learning path for this second version of the course included two full-day physical workshops (at the start and at the end of the course), 20 hours of online self-paced study, and a midway online group meeting with 4/5 participants, which was facilitated by the educational designers. Data were collected through surveys, qualitative interviews, and activities in groups during

[7] For a full description of the project, see https://www.teknosofikum.dk

the workshops. In what follows, we present some excerpts, selected to discuss the forces/movements/connections at work in the materialization of a NL space.

> *I would like to have (...) more interaction with people to discuss things afterwards, because I'm so much on my own (L., final interview, trial 1).*
>
> *I like the fact that you have several ways of being informed, because this only strengthens the way that we teach, or inspires us to how we can go about our things and makes us reflect: 'am I doing it the right way to what I want to achieve?' (A., final interview, trial 1).*
>
> *I liked this exchange in the forum where I can also see different views depending on different professions. For me, it's very valuable to see the different view angles on some things, because when we had the first meeting in person, there was this one exercise, this implosion thing, which we did, and I actually liked that. But I don't see how I could apply this in my field with the specific things I'm teaching' (S., midway interview, trial 2).*
>
> *What I like about our group is the age distribution. (...) You see the older people coming with experience and the younger ones with: 'let's just try something', because they can. And you see that this exchange would also work the other way around (H., midway interview, trial 2).*
>
> *I did not expect to hear that colleagues that work with such different subjects had experiences so similar to mine with students, with the institutional challenges..I learned a lot today (M., workshop 1, trial 2)*
>
> *I think something that is essential is to have some time to work with each other in an unstructured way. (...) To give each other this vocabulary about what is technology, and how we understand technology to be (T., workshop 2, trial 2).*
>
> *It is so much easier now to call any of you because we have been in the same room, we have shared this experience before going online, so you are not total strangers. This aspect is very important, as networking is also relevant for us academics (H., workshop 2, trial 2).*

In this brief excursus of a few shared opinions about the Teknosofikum experience, we can delineate some results that highlight important aspects for the initial materialization of a community.

The NL space at Teknosofikum

Connections - First, interactions and communication among the participants - both online and in physical meetings - are mentioned as drivers for reflection, inspiration, and potential change for teachers' practices. In these results, we find evidence of the importance of weak ties. Teknosofikum course participants mostly did not know each other before the course. Not only do they belong to different institutions, but they also work in different fields: Law, Design, and Computer Science. Nevertheless, they appreciate the opportunity to connect with peers, to exchange ideas about teaching. For their own surprise, they found common challenges and common goals, in the conversation with their peers.

Forces - Second, on some occasions the participants defined Teknosofikum as a 'safe space', where they were challenged with new activities (which they both liked and disliked) but failure was accepted and even encouraged. The possibility to build such a protected environment, where rules are different from the established institutional norms, and outside of structural assessment and evaluation provided participants with eagerness to try. They experienced being pushed by divergent, centrifugal forces, and they made some experiments with teaching in their own disciplines. This happened because of the course requirements (e.g. in terms of producing a video or a mind-map) but also because of the meeting with the difference. In many cases, in fact, the participants mentioned how they learned from being with colleagues that were completely different from them, in age, discipline, or teaching perspective. Instead of representing an obstacle, this difference triggered their curiosity, and made them try out (or plan) something new.

Movements - In the case of Teknosofikum, the short duration of the two trials - one and six weeks, respectively - did not allow for the (re)combination of roles and positions in the NL space. However, it is relevant to mention

that the participants asked for more. At the final workshop, they requested that the online course remained available to them for future incursions; and they asked the educational designers to plan Teknosofikum not only as a 37-hour course, but as lifelong and continuous learning.
Based on these findings, the next edition of the course (March-May 2022) will be designed as a safe space for dialogue among participants. This comprises the new initiative of forming pairs of colleagues from the same institution that will support each other along the course, so that weak connections can become stronger. After the second iteration of Teknosofikum, a new educational designer has been onboarded to take care of the workshops preparation and hold synchronous online meetings with groups of participants, which will be conceived as 'drop-in' supervision of their work.

Discussion and conclusion

The micro-analysis of interactions presented in this study are insightful in showing fundamental processes of materialization of NL spaces, which can inform future design of activities within the two projects.
In the case of MIL, the movement away from the solo-perspective, listening to multiple voices becomes useful for the students, and a method to see their own voice and their own organization in new ways. The students come to the seminar with a self-referential perspective supported by their 40 images, and then we take them through various movements that allow them to see their own voices and their own organization, but also to get a glimpse of other people's voices, what they see in the organization, and how the theories make us able to see new issues, tensions, and relations. In these movements, the students discover that they need each other. They are not alone. They have some common preoccupations, and they see the strength in the shared observations, but also where their views and their organizations dissociate. In these movements, the disturbances that we have used (the guiding questions, introduction of activity theory, presentations on anthropological methods), facilitate the transitions between the centripetal and the centrifugal at work, as well as between the peripherical and the centered positions in the network. The aim of the proposed activities is to develop the students' self-authoritative voices, to invite them to go out with their insights – not entirely alone – but with their group and engage in a discussion on LinkedIn or similar spaces, and to get back home looking for the many voices in their organization. To design for the materialization of NL is, therefore, to design for the movements – between strong and weak ties, center and periphery, and the centripetal and centrifugal forces. There is no priority of the core or the periphery, but the strength of the design is in the movements themselves.
In the case of Teknosofikum, the networking aspect of the project was underlined by many participants, as well as the importance of having a space where they could exchange ideas and experiences about their own practices. In this perspective, the connections proved themselves powerful and useful for a cross-institutional exchange of voices and points of view. The forces at work show how the dialogue is built across disciplines and even disciplinary fields (Law, Design, Computer Science), on a different level than the usual institutional teacher professional development courses. Perhaps, these connections are initially more volatile and unstable, but nevertheless very meaningful for the course participants. These are the reasons to re-plan the next edition with a stronger focus on continuous dialogue and feedback among the participants, group activities along the course, and collaborative outcomes to present in plenary at the end of the process.

Following a cross-case analysis method, it is possible to highlight similar processes emerging from the two presented cases. First, the importance of exchange and collaboration emerges as the most relevant takeaway for the participants. Networking, connections, movements, and forces are at play in triggering unexpected outcomes, which are expressed in terms of wishes by the participants. The wish to share knowledge with peers stands out, with reference to teaching, communication, and institutional challenges.
Secondly, the two projects seem to attempt to design for the materialization of a common goal. Despite their differences in theoretical foundations, target group and pedagogies, MIL and Teknosofikum pursue professionalism not merely through the achievement of skills and competencies, but through a deeper reflection on professional' identity.
In line with other studies (Pischetola, 2021; Rientis and Kinchin, 2014), these findings indicate that educational research on teacher professional education can broaden its focus beyond formal programs and across disciplinary and/or institutional boundaries. If we agree with the definition of dialogue as "the interanimation of real voices where there is no necessary 'overcoming' or 'synthesis'" (Wegerif, 2011, p. 3), we will see that dialogue is what *creates* space in-between individuals in educational practices. In this paper, we have tried to work with this concept of dialogue: neither choosing between dualistic positions nor synthetizing them in one, but rather accepting the messiness of NL processes, and designing to support their creation.

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Data stories: speculative methods for researching digital surveillance in higher education

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Abstract

Higher education systems have always involved monitoring through data collection, assessment, and evaluation, shaping the intellectual work, and tracking the bodies and activities of students and teachers. However, surveillance in many higher education settings has become increasingly pervasive and fine-grained as monitoring and data-gathering technologies grow in sophistication and as the quantification and measurement of everything from outcomes to student satisfaction to engagement is increasingly valued in universities. Concerns are growing about negative impacts on learning relationships, exploitative commercial uses of collected student data, discriminatory practices, and even political, social, or physical harm inflicted because of surveillance and monitoring. At the same time, the complex surveillance cultures of higher education make it difficult to disentangle personal and collective responsibility, understand the gap between intentions and impacts, or navigate the significant risks that can come, for some, with speaking about these matters. In 2020, a research project was funded to develop a 'data stories tool to support people working and studying in higher education, particularly learning technologists, to develop anonymous speculative stories about what the future of surveillance in higher education might look like, and to draw out themes, concerns about and hopes for that future. The methodology used to design this tool drew from speculative and co-design approaches. This paper discusses how these approaches were mobilised to produce a space for people to make new meanings around surveillance, and to share these with others in a networked environment, in the form of Participatory Speculative Fictions. It discusses a few of the stories produced, and how they shed light on the potential of speculative methods for working with and possibly reconfiguring networked learning futures.

Keywords

Surveillance, higher education, speculative methods, co-design, storytelling, datafication, participatory speculative fiction

Introduction

The datafication of many aspects of higher education has led to a situation of increasing visibility and monitoring of the activities of students, staff and processes of learning, teaching and assessment (as well as research, knowledge exchange, human resources and a range of other activity). The contemporary university is therefore enmeshed in complex surveillance cultures, where individuals and communities are negotiating and actively participating in an "attempt to regulate their own surveillance and the surveillance of others" (Lyon, 2017, p. 824). This has impacts on relationships both within and beyond individual institutions, with lines of reporting and visibility extending to government, corporations and other actors in each educational ecosystem. Such visibility of people and processes is used for purposes both benign and problematic: data is used to facilitate co-operation, but also to gain advantage in a competitive system; to understand patterns of information needs among students in the library, but also to monitor attendance (with severe implications for international students, for example). Harms and risks from surveillance and monitoring can be difficult to quantify, but are tied up in some students' and staff's experiences of inequality and mistrust. The use of learning technologies and digital environments produces significant opportunities for learning and teaching to be datafied, monitored and surveilled, and for those aspects which cannot be datafied to be rendered insignificant or undervalued. The globalised nature of the HE sector suggests that we are all on the same path, even if the extent to which surveillance cultures have developed to date

varies across national, geographical and economic contexts. We are writing from within a UK higher education context, but at least some of the stories we discuss are from other higher education contexts, and the themes are similar.

The lack of clear consensus about the nature and potential futures of surveillance in universities should not be taken for a lack of concern. We have seen through the Covid-19 pandemic a greater sensitivity to the harms surveillance technologies can bring - not only to relationships and to learning environments, but to health and wellbeing. There is a need for more understanding of the experiences, hopes and fears of those affected by surveillance cultures in universities. At the same time, gathering such data can be complicated, as digital resignation (Draper & Turow, 2019), fears about repercussions and the complexity of the digital ecosystems that now exist in higher education work against forms of research that ask straightforwardly for experience or opinion on these matters. We need more creative methods for developing insights into these issues. This paper discusses one such approach - Participatory Speculative Fiction - and its use in telling data stories to contribute to an understanding of desirable and undesirable networked learning futures.

Surveillance cultures and networked learning in higher education

Learning technologies within the university help people communicate, collaborate and create, as well as make resources available, store data, keep track of activities, assess performance, remind us of due dates, check for plagiarism, and more. In addition to their specific functionality, many of these technologies offer the capacity for increased surveillance, and some are already being used to monitor or quantify learning activities. While networking learning approaches can support and help reimagine critical and emancipatory education (Networked Learning Editorial Collective (NLEC), 2021), some technologies that make them possible also bring increased opportunities for surveillance for purposes of both control and profit. Forms of
monitoring can be helpful in increasing accountability, providing transparency that might improve quality, alerting people to risky situations, and providing opportunities for caring interventions. However, despite the potential benefits there are also potential detriments, especially when control and profit motivate the use of surveillance technologies, and when their unequal impacts are not recognised.

A ‘sensibility of surveillance’ in higher education (Ross & Macleod, 2018) is not just top-down, and often intended to be benign or helpful, but nevertheless contributes to surveillance cultures which “alter teaching and learning environments in complex ways that are often surprising and at odds with their original intent. What matters is not practice or purpose, but presence” (Knox, 2010). These technologies also contribute to a hidden curriculum of datafication, where being visible, tracked and monitored without meaningful consent is normal and expected. Even where consent is sought and given, it can be difficult for staff and students to carry out an informed cost-benefit analysis. Claims about the potential benefits of monitoring technologies like Learning Analytics are not always borne out by evidence of positive impact (C. Watson et al., 2017; Wilson et al., 2017). All of this can lead to what Draper and Turow (2019) call “digital resignation”, where people take no, limited or inconsistent action in relation to privacy concerns, because "while these people feel dissatisfied with the pervasive monitoring that characterizes contemporary digital spaces, they are convinced that such surveillance is inescapable" (p.1825). Such resignation sits uncomfortably in a system of higher learning where critical thinking and the ability to question taken-for-granted ways of working is valued.

In addition, the privacy that is being surrendered has particular, and perhaps fundamental, value in the university. As Cohen (2012) argues it functions to shelter subjectivity "from the efforts of commercial and government actors to render individuals and communities fixed, transparent, and predictable. It protects the situated practices of boundary management through which the capacity for self-determination develops” (p.1905) and “the processes of play and experimentation from which innovation emerges” (p.1906). Without an expectation of control over privacy, practices that might otherwise be noted and debated may instead become normalised. Macfarlane (2016) highlights how "bodily performativity" has become established in students university experiences, where attendance (physical or virtual) is treated as a proxy for engagement in a range of problematic ways. He argues that "attendance policies demonstrate both a lack of trust in students and failure to respect their freedom to learn as an adult" (p.81). Threats to self-determination, trust and respect are at the heart of why surveillance cultures are of urgent importance for networked learning scholarship and practice.

The pivot to online teaching, learning and assessment during the Covid-19 pandemic has exacerbated many existing issues and ushered in new forms of surveillance (Beetham et al., 2022), partly due to the speed at which institutions were forced to act, as a result of which:

> existing checks and barriers to technology adoption and digital learning were often set aside. At national or regional levels, for example, regulatory privacy laws were relaxed to enable widespread adoption of communication tools… and some countries with legal constraints regarding the limits on residential universities providing distance education relaxed those constraints. Within universities, contracts with software vendors were signed quickly. (p.17)

Along with current intensification of surveillance, there has been increasing pushback against the impacts and harms of monitoring and datafication, and its unequal effects. Formal, informal, individual and collective responses to surveillance technologies have taken the form of resistance, advocacy, education, regulation, engagement and investment (ibid, p. 24). Future possibilities for digital participation are tied up with questions about visibility, anonymity and openness, and the spaces between them, with practices like critical disengagement, challenges to social media practices of value extraction, avoidance of controversy, and strategic concealment (Bachmann et al., 2017) offering visions for the "'renovat[ion]' of conventions of digital space" (Duffy & Chan, 2019, p. 127). Alternative ways of thinking about and enacting authenticity, including in anonymous spaces, may need the contemporary university to examine "principles and frameworks which respect [anonymity's] social value" (Bayne et al., 2019, p. 104). And technical knowledge may need to be mobilised in the service of alternatives to intrusion and toxicity – not in the form of a temporary 'digital detox', but in genuinely different forms of engagement (Natale & Treré, 2020).

The risks of and further possible responses to surveillance cultures in higher education are in urgent need of exploration. However, there are barriers to this exploration – in the risks it poses to individuals at this point in time (Beetham et al., 2022); and in the power of sociotechnical imaginaries (Jasanoff, 2016) and discursive closures (Markham, 2021) that make certain technological futures seem inevitable. For this reason, creative, inventive and speculative methods are useful and necessary, and we move on now to discuss these approaches and their value in researching networked learning futures.

Speculative methods for researching networked learning futures

Themes of automation, personalisation, efficiency, visibility and ubiquity have been the focus of attention, discussion and often heated debate in digital education contexts over many decades, with implications for how networked learning futures are conceived and anticipated. The role of digital technologies tends to be viewed in instrumental terms (Bayne, 2014), contributing to narratives of education that see the future as a site for optimisation, colonisation or protection (Facer, 2016), and educational research overemphasises a 'what works' agenda which limits productive futures work in the field (Ross, 2017). In addition, powerful sociotechnical imaginaries are in circulation: "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff, 2016, p. 4). Among these are 'edtech imaginaries' (Friesen, 2020; Watters, 2020), expressing ideals of education in terms of scale, personalisation, commercialisation and innovation. These imaginaries underpin policy and practice in both overt and subtle ways, and teachers, learning technologists and others have an important role to play in their generation, reception and development.

To work in a more critical and questioning way with digital education futures, and their impacts on the present, requires methods that can bring particular ideas or issues into focus by envisioning or crafting conditions which may not yet currently exist, working against established imaginaries and countering discursive closures, where "practices or technological designs are… removed from any chains of causality or results of decision-making, so that they seem like processes that just exist" (Markham, 2021, p. 392). Speculative methods offer a generative approach to this work (Ross, 2017). The authors of a 2013 manifesto called Speculate This! propose that there are two registers for speculation – economic and cognitive – and these are connected by "investments [that] project into and stake claims for the future" (Uncertain Commons, 2013, p. 7). They differ, however, in their attitude to uncertainty, aligning with either 'firmative' or 'affirmative' modes of speculation. Firmative speculation attempts to solidify, pin down, or enclose the future (p.9). It is what permits measurement and calculation of risk, making it "indispensable for thinking and acting within systems of advanced capitalism everywhere, anywhere, across the board" (Cortiel et al., 2020, p. 9). Affirmative speculation, on the other hand, "creatively engage[s] uncertainty" using intuition and play, and "seeks to act in shifting, multiscalar worlds" (Uncertain Commons, 2013, p. 10). It is this second register that forms the focus of speculative methods as we define them here.

Speculative methods function within a complex interplay of past, present and future; they are "overtly constitutive" of the problems, topics and questions they engage with (Wilkie et al., 2015); and they centre engagement and audience in a way that adds to the glitchiness (Bodden & Ross, 2020) and unpredictability of their effects. Michael (2012) describes them as "'inventive problem making' in which the parameters of the issue are reconfigured" (p.536). In their foundational speculative design text, Dunne and Raby (2013) critique the "downgrading of dreams to hopes" (p.8) that characterise the contemporary moment and its wicked problems, and identify in speculative design a way to use futures as:

> a medium to aid imaginative thought… Not just about the future but about today as well, and this is where they become critique, especially when they highlight limitations that can be removed and loosen, even just a bit, reality's grip on our imagination. (p.3)

In this sense, speculative methods are not solely about designing preferable futures, but about using the uncertainty of the future creatively in the present, to reveal and develop insights about our current situation, what has led to it, and what might (conceivably) be different. Speculative approaches include fictions, researcher-made objects, participatory design or storytelling activities, and speculative analysis (Ross, in press). The project discussed in this paper used a participatory speculative fiction approach, and so the remainder of this section focuses on speculative storytelling methods.

Researcher-written speculative stories go by a number of names: most commonly social science fiction, design fiction or speculative fiction. They mostly take the form of short stories or vignettes, often incorporated into or cited in scholarly articles. In educational research such approaches have been influenced by the use of speculative fiction in broader technology studies and sociological fields (see for example: Benjamin, 2016; Graham et al., 2019), and they are typically set in schools or universities. They tend to focus on the implications of data-driven education and platformisation, and are more often than not dystopian. This may be because they are informed by the significant amount of critical work done in the past decade that has highlighted the inequalities and risks that come with increasing datafication and privatisation. A 2020 special issue of the journal Learning, Media and Technology, focused on speculative futures, is a prime example of the use of speculative fiction in this field. For example, Hillman, Rensfeldt and Ivarsson's (2020) three speculative scenarios cover feature creep & privatisation, data exploitation, and recentralisation in a future Swedish school system, building on their review and analysis of the current state of the system. They highlight the risks, the persuasiveness and, eventually, the ubiquity of such a system. Selwyn et al (2020), building stories around a Melbourne, Australia-based school of 2030 they call Lakeside, look at the mundane realities that people in this school might experience. Their linked stories paint a picture of a "standardized, benchmarked and centralized" system that has "little room for affective, embodied and spontaneous action" (p.104). Cox (2021), analysing possible futures for artificial intelligence in higher education, observes the complex temporalities involved in telling stories about this topic:

> rather than a single technology, something like AI is an idea or aspiration for how computers could participate in human decision making. Faith in how to do this has shifted across different technologies over time; as have concepts of learning… confusingly from a temporal perspective, uses of AI and robots in HE are past, present and future. (p.2)

Cox situates his own use of fiction as a research output, but observes that fictions are also used to elicit research data or can be co-created with publics (p.3). This co-creative approach – what we have called Participatory Speculative Fiction (PSF) – informed the Data Stories project.

Story-based research methods are well established in the social sciences and other disciplines, including in the form of narrative and fictional inquiry (Clandinin & Connelly, 2000; Clough, 2002), transmedia and digital storytelling (Hancox, 2017), and in futures-focused social science fictional methods (Gerlach & Hamilton, 2003; Suoranta et al., 2021; A. Watson, 2021; A. Watson & Gullion, 2021). Surveillance as a subject of social inquiry has been the focus of a number of storytelling projects in recent years (Cahill & Newell, 2021; Screening Surveillance, 2019). The PSF approach also takes inspiration from participatory modes of design fiction. Participatory modes provide a response to the tendency of design fictional or speculative approaches to foreground 'elite' or powerful voices (Forlano & Mathew, 2014, p. 11; Light, 2021) – those of researchers, for example. The elicitation of speculative stories from research participants, combining speculative fiction and co-design or co-creation, also offers a powerful way to enable participants to engage in public discussion of subjects or topics that they may be reluctant to talk about, perhaps because of complex loyalties, or perceptions of risk (Wilson et al., 2022). They are also effective in surfacing fears (and to some extent, hopes) about what has not yet happened, but

might. Building on the development of a novel approach to the creation of Human-Computer Interaction (HCI) design personas and scenarios (Wilson et al., 2018), our project's PSF approach was intended to put potential users of a system's ethical and political values at the centre of the design process. It did so by creating a scaffolded storytelling process that prompted authors to step away from the confessional or the accusatory, instead imagining what might happen and shifting actors and interactions into new configurations. Working in this speculative register produced some fascinating and important visions of the contemporary and future university and the role of surveillance within it.

Telling data stories

Between February and July 2020, the project team undertook the development of a scaffolded storytelling tool that uses fiction writing to explore aspects of an interaction with technology, and hopes or concerns it raises, by speculating about what could happen. Authors can choose to publish their stories anonymously on the Data Stories web site: http://datastories.de.ed.ac.uk

The storytelling tool consists of a three-stage process: prompts, mapping and writing. In the first stage, users of the tool are asked to think of "a time when you have used, or become aware of, a bit of technology (software or hardware) that was either explicitly being used for surveillance or might be used for surveillance, even if unintentionally". With this example in mind, they are invited to select and answer questions from a drop-down list, including prompts such as:

- What is being scrutinised/quantified?
- What technologies enable the scrutiny?
- What is the purpose – e.g. monitoring, audit, resource allocation, control, comparison, correlation?
- What form might an action or intervention take?
- Who benefits? What are the benefits?

Once a question is answered and saved, it becomes a story object that is placed in the second stage of story creation, the story map. In the map, the objects first appear as unconnected nodes, which can be clicked and dragged around the map space, with lines added between them and labelled to indicate the relationship between them. This map then forms the inspiration and possible structure for a multimodal story, written and submitted in the 'write' tab of the tool. The story can contain text, images, hyperlinks, social media objects such as tweets, GIFs and emojis. The length and style of each story is not prescribed, and stories are submitted and published anonymously, with no personal information collected, no attribution and no link to an author.

Two research questions informed the project design initially:

- How can the role of surveillance in higher education be interrupted, reduced or reconfigured through speculative storytelling and co-design?
- What questions, narratives and issues will shape research in the ethics of data-driven higher education?

A third question developed along with the Data Stories creator:

- What would people publicly imagine about surveillance if they were free to do so?

The published stories on the site at the time of writing are characterised by an interplay of present concerns and potential future issues, trajectories and imaginings. The main characters in these stories tend to be individual students or academics, but there are also stories told from the perspective of a student union, a cleaner, a director, and several ambiguous characters experiencing aspects of surveillance culture in or beyond a contemporary or imagined university. Many of the platforms are familiar in these stories – learning management systems, online exam proctoring services, productivity or collaborative software, student request management systems – but some of the technologies, data forms and data uses are novel. Characters in the stories experience neuro- and bio-scanning, health & wellbeing metrics and measurements, DNA-driven decision-making, competition for lecture views, and a mirror that quizzes students about their first year experience.

For the most part, ways of understanding surveillance in these stories tend toward the dystopian, with a sense of technology developments impacting the university that are undesirable but unstoppable – more on this below. At the same time, the ways people are imagining the future of higher education allows us to explore networked learning principles of relationships, connection, collaboration, and the complexity of the assemblages of technologies, infrastructures and actors that constitute learning settings. We draw here on four stories that shed light on these complex interactions, exploring the nature of connection and collaboration, the datafication of

emotion, and the individualisation of learning that may come with increasing monitoring in future digital university settings.

In the story "DNA-fueled universities"[i], the protagonist, a student called Kari, reflects on the role of DNA sampling and analysis in a future university system. From the application process onwards, DNA plays a role - though what, exactly, the role constitutes is not made explicit. Kari guesses that it is used to personalise her own and others' experiences beyond their expressed goals and preferences, identifying the right 'fit' of university, campus experiences, roommates and even meals. This personalisation works for her - she describes the 'perfect match' she found in her roommate, house, meal plan and overall university experience. At the same time, she describes 'deep personalisation' as feeling invasive and restrictive, and observes how it 'tormented' some of her friends with its decisions on their behalf. Above all, it seems to create a feeling of doubt about the limits of self-knowledge and perhaps even free will - casting a shadow on the notion of the 'perfect match' in a way that is potentially damaging to relationships that are generated through the datafication of self.

Datafication takes on an even more sinister role in "William Stone P267"[ii], where the main character, Will, is subject to intensive online monitoring of his involuntary reactions, posture, body temperature, heart rate and other metrics in test conditions, all aimed at scoring his social-emotional learning and other capacities alongside his knowledge. The results of this "classification day" testing will have important consequences, though these are not spelled out in the story. In response to this monitoring, Will hones “an ability to fake his feelings”, including by leveraging embarrassing or happy memories at appropriate moments. While apparently successful, this self-hacking comes at great personal cost to Will, who must banish 'anger, regret and exhaustion' in order to perform appropriately, and can only see other students as competitors for the coveted 'P' classification.

Other imagined consequences of intensive monitoring and individualisation are seen in a story set in a future where teachers’ lack of ability to fully know their students in an evidence-based way is justification for their removal from all but “innocuous” tasks. Like the DNA story, this is a future characterised by personalised education that gives students "what (it calculates that) [they] need", and here it is made explicit that those needs are of interest only "in order to satisfy the needs of society” (Remembrance[iii]). The narrator is a teacher, kept around to provide a "human touch" in a system that is "still improving" in its ability to deliver personalised teaching to each student. They trace a trajectory from the pandemic pivot to online teaching, to the automation of student profile-building, to a system in which students are "pretty transparent", while algorithmic processes are obscured.

These three speculative stories give a rich picture of the kinds of concerns and possibilities people anticipate in future educational settings. The final story we shall discuss here is a reflection on current practice - the use of online collaborative work spaces. The narrator here describes feeling responsible for knowing “who has access to what - but this became impossible to manage properly. No-one knew who could ‘see’ what, and what is Microsoft doing with all this data?” (Microsoft Teams and the cost of collaboration). Matters of visibility, responsibility and the difficulties of managing privacy and access in 'black boxed' digital environments foreshadow the fears expressed in the other three stories.

The future told through these future-focused data stories has clear connections with fears expressed about loss of control in the present. However, these fears are not separate from efforts to create positive learning experiences with and for students in networked environments. In these stories we can see frustration and anxiety but also, in telling and sharing them, glimpses of different positions and relationships that could exist. The telling of stories is an active rejection of digital resignation (Draper & Turow, 2019). That they tend towards the dystopian is perhaps not a surprise given the current moment and mood around surveillance and datafication, but dystopian imaginings are not the same as resignation and not the opposite of hope, as Priyadharshini has argued:

> the affects of dystopia do not work in predictable ways – they seem to indicate that hope and despair are not clearly separable in the monstrous, and that there is something to be gained from knowingly engaging with such visions of the future. (Priyadharshini, 2019, p. 7)

For this reason, we see PSF as beneficial in exploring controversial and difficult topics. By tapping into complex experiences of surveillance and monitoring through a creative and speculative approach, shared understandings and new possibilities come to the surface, and from there, a better chance for collective action around data practices. One way this might emerge in this particular context is through the development of a higher education surveillance observatory, which we discuss in the final section.

Conclusions

In the recent Networked Learning redefinition paper (Networked Learning Editorial Collective (NLEC), 2021), the authors note a rich set of questions about "trust, power, identity, belonging, difference, affection, reciprocity, solidarity, commitment and time"; "the socio-material, affordances, instruments, access, appropriation, ownership"; and "knowledge, values and action, learning and doing, meaning-making, negotiation, shared projects and praxis, scale, scope, pace and duration and the capabilities needed to shape a world worth living in" (p.314). These questions are also at the heart of the speculative approach undertaken to elicit the Participatory Speculative Fictions created using the Data Stories creator tool, with a focus on generating "a deeper understanding of the role surveillance has played and continues to play in universities and tactics and strategies for interrupting and perhaps reducing or reconfiguring its impacts" (Collier & Ross, 2020).

Like most speculative fiction, the scenarios described in the stories are likely to have grown from the seeds of experiences that are germinating in the contemporary university. This suggests that, if we wish to influence the direction of growth and change, now is the time to act to make these contemporary experiences and the factors and conditions that make them possible more visible and themselves open to scrutiny. We suggest there is a need for a Surveillance Observatory, through which surveillance itself can be monitored, productive approaches can be identified, and methods of resistance exchanged. Our vision for such an Observatory involves the collection and sharing of speculative stories, as well as the collection and aggregation of facts and accounts of practice and policy.. The PSFs being created through our project are a first stage of co-design, allowing the articulation of key themes, concerns and practices that will serve as organising principles for the Observatory's structure and functionality. What is clear from the stories that are being told with the Data Stories tool is that near-futures are being imagined in which academic (staff and student) identities have been disrupted and dislocated; in which trust is replaced by knowledge gained through surveillance; and in which personalisation may stifle and normalise as well as create ease and wellbeing; any future Observatory needs to allow the people being affected by these changes to record and share their experiences.

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[i] http://datastories.de.ed.ac.uk/datastories/view/165
[ii] http://datastories.de.ed.ac.uk/datastories/view/186
[iii] http://datastories.de.ed.ac.uk/datastories/view/187

Faculty Attitudes and Response to Online Learning in Transnational Higher Education in Qatar: A Promising Future

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Abstract

This paper presents preliminary results from a doctoral thesis investigating faculty attitudes, preparedness, and response to adopting technology-enhanced learning during the 2020-2021 pandemic. The current events that affected teaching and learning worldwide necessitated a re-evaluation of the traditional higher education system and imposed an immediate adjustment to teaching approaches. Using a survey and semi-structured interviews with faculty members teaching at transnational higher education institutions in the state of Qatar, this paper presents the recent pedagogical shift experienced during the pandemic. Using a case study approach, this paper examines the impacts of this shift on student learning from faculty perspective and discusses the implications of this shift on networked learning research and practice. Findings suggest that faculty found online teaching more difficult than previously perceived which encouraged them to be creative and innovative in their teaching approaches. However, there does not seem to be an agreement as to whether online learning is the future of higher education as some faculty still see more value in face-to-face teaching. Furthermore, student assessment is an issue for some faculty. Overall, faculty members seem to appreciate the online teaching experience as it allowed them to try new teaching approaches, use new technologies, and integrate new assessment techniques that they would not consider in their pre-pandemic classes.

Keywords

Technology-enhanced learning, networked learning, transformative learning, pandemic, emergency response, case study.

Introduction

Up until the Covid-19 pandemic, the idea of online learning was still being entertained and integrated on an individual level (Graham et al., 2013; Wieland & Kollias, 2020). In April 2020, higher education institutions in 185 countries were closed following the spread of the Covid-19 virus, with more than 1,000 million learners affected by the abrupt transformation (Marinoni et al., 2020). This paper investigates the adoption of online learning by faculty working at international branch campuses of American universities in the state of Qatar, their attitudes and response during the latest pandemic and the role networked learning plays in bridging the gap between the different elements of online teaching and learning to support faculty and students.

The Different Constituents of Online Learning

Research on online learning in higher education abounds in a range of domains including flipped classroom, social media, self-directed learning, gaming, artificial intelligence, learning analytics, open educational resources, digital credentialing, and blended and hybrid course models (Ajjan & Hartshorne, 2008; Bolliger & Wasilik, 2009; Ulrich & Karvonen, 2011; Baltaci Goktalay, 2013; Lewis et al., 2013; Gallagher & Palmer, 2020; Pelletier et al., 2021). Hodges et al. (2020) considered that while online learning requires time and careful planning, emergency remote teaching emerged as a temporary shift from face-to-face or blended teaching to remote teaching following the pandemic. The reason for differentiating between the two is that emergency remote teaching comes in times of

uncertainties and lacks planning, preparation, and support (Hodges et al., 2020). It usually takes between six and nine months to create an online course (Hodges et al., 2020), however, the pandemic left faculty members with no choice but adopting the online modality leaving them with a restricted margin of freedom to choose between synchronous and asynchronous delivery, communication methods, and assessment techniques (Iglesias-Pradas et al., 2021). For instruction to continue with minimal impediment, several factors must be in place to support faculty preparedness in emergency situations, such as the deployment of instructional designers and technologists, maintenance of a robust and flexible IT infrastructure, and the promotion of communities of practice (Lave & Wenger, 1991) enabled through networked learning (Fox, 2005).

There is a significant body of knowledge on adoption barriers and integration opportunities of technology in instructional practice such as lack of preparation to teach online, inadequate access to digital devices including hardware and software, insufficient internet bandwidth, class size, communication between faculty and students, as well as the lack of faculty and student support (Taft et al., 2011; Newland & Byles, 2013; Reid, 2014; Wright, 2014; Horvitz et al., 2015; Wichadee, 2015; Nworie, 2021; Iglesias-Pradas et al., 2021). Iglesias-Pradas et al. (2021) stressed the important role of learning management systems infrastructure and IT support, flexible decision-making by administration, the establishment of informal communication channels, and the development of faculty members' digital skills that allow a successful transition to emergency remote teaching.

Networked Learning as a Holistic Approach to Online Learning

The pandemic situation created a myriad of feelings among faculty members and students. Faculty used to consider online teaching to threaten their "autonomy and control of the curriculum," requiring more labour and time and additional training (Keengwe & Kidd, 2010; Esani, 2010). Therefore, faculty resistance to using technology is due to lack of training rather than lack of technological proficiency (Thormann & Zimmerman, 2012) which is also re-emphasized in a recent study by Hüttel and Gnaur (2020). However, a study by Lederman in fall 2020 brought a silver lining in the cloud of online learning. The study that took place in the U.S. found that faculty confidence in online learning has grown by 10% between May and August of 2020 (Lederman, 2020). In his study, Lederman (2020) found that faculty's increased positive attitude towards online learning was a result of their positive experience with a) student engagement; b) flexibility; and c) content development. Similarly, this was also echoed in a study by Lee et al. (2021) in which it was found that students were actively engaged in "creating meaningful learning experiences" (p. 168). However, the literature also shows that students' engagement is positively affected by student–student interaction and instructor presence (Kim & Kim, 2021) and the lack of engagement might lead to students drop-out (Spitzer et al., 2021; Szopiński & Bachnik, 2022).

Keengwe and Kidd (2010) considered the role of online teaching faculty to consist of four categories: pedagogical (educational facilitation), social (friendly environment), managerial (setting agenda, objectives, rules, and decision making), and technical (use technology easily and facilitate its use by their students). These categories correspond to the networked learning theory and practice especially in its latest definition in which five essential elements come to play together as "processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (Networked Learning Editorial Collective, 2021, p. 319). Rather than focusing on the technology or communication channel as in the case of online learning, networked learning presents a holistic approach that takes into consideration 1) interpersonal relationships such as trust, power, and identity, 2) digital technology, especially when it comes to affordances, access, and ownership, and 3) collaborative engagement which entails knowledge, meaning-making, negotiation, scope, duration, etc… (Networked Learning Editorial Collective, 2021).

Overview of the Context and Aims of the Study

Networked learning as a framework encompasses face-to-face and virtual contexts through the same process of "learning from one another, learning with one another, learning on behalf of, and Meta-learning" (Jackson & Temperely, 2007) while capitalising on a balanced relationship between learners, tutors, and resources (Jones et al., 2008). Therefore, as expressed by Carvalho and Goodyear (2014), networked learning cannot be simply designed but should be *designed for* a specific community to allow meaningful engagement (Boud & Prosser, 2002). This is true especially in transnational higher education (TNHE) settings where faculty designing and delivering their curricula operate in a unique cultural environment.

In Qatar, Education City, a private, non-profit organisation provides a unique setting in which eight world-class higher education institutions - six American universities, one British, and one French -in addition to a young home-

grown university operate to fulfil Qatar's National Vision 2030 (QNV 2030) of a "world-class educational system" that delivers the best educational opportunities to its population to increase scientific research and foster innovation (General Secretariat for Development Planning, 2008; Khodr, 2011). These TNHE institutions offer foreign degrees with admission and graduation standards similar to their home campuses (Miller-Idriss & Hanauer, 2011; Badry & Willoughby, 2016) and have also experienced the sudden shift to online learning following the pandemic. Faculty members teaching at these institutions not only come from different countries and speak different languages, but they also bring with them their own value systems influenced by their upbringing, educational backgrounds, and philosophies of teaching (Lee & Brett, 2015; Leask & Carroll, 2013). These complexities undoubtedly affect their perceptions of the approaches and techniques required for effective teaching to meet the learning needs of a technologically savvy generation. Students also benefit from faculty's diverse backgrounds as they can bring a broad range of teaching practice, diversified content, and even serve "as role models to the students" (Antonio, 2003; Collins & Kritsonis, 2006). Therefore, this paper aims to:

- investigate faculty attitudes towards the recent pedagogical shift following the Covid-19 pandemic;
- examine the impacts of this shift on student learning from faculty perspective;
- and discuss the implications of this shift on networked learning research and practice.

Methodology

Study Design

This case study uses an explanatory sequential mixed-methods approach as it builds on the quantitative elements of the study to develop the qualitative data collection tools (Creswell, 2014, p. 220). A case study is usually used to provide "an in-depth analysis of a case" (Creswell, 2014, p. 14) and interpret a particular situation (Yin, 2009; Cohen et al., 2018). Participants in this study are faculty members from six American higher education institutions in Education City in Qatar. The first part of data collection is a survey that explores faculty perceived challenges towards the imposed online learning situation following the 2020 pandemic crisis in the State of Qatar. Bryman (2012) believes that qualitative interviews can be used to "make the survey data more robust" (p. 635). Therefore, based on the survey results, faculty members were contacted to take part in semi-structured interviews to investigate their experience adopting, designing, and delivering online learning to students of the six American TNHE in EC.

Data Collection Methods

Phase 1: Survey

The first data collection tool is a survey designed for faculty members who have experienced the imposed move to online learning due to the pandemic crisis of 2020 and consisted of 20 questions.

The survey was piloted with five participants - two faculty members, one librarian, one instructional designer, and one engineer - who provided valuable feedback as to the flow of the survey, the language used, the choices provided for closed questions, the length, and other mechanic flaws that were identified during the piloting phase. The survey was sent to four (out of six) American higher education institutions in Education City in Qatar with a total number of 297 faculty members. 30 responses were recorded with one respondent dropping out after taking only the first four questions. Only 29 faculty completed and returned the survey which constitutes 10% of the total targeted population. Majority were male respondents (17 respondents; 58.6%). It is important to note that the survey and interview questions use the terminology "disruptive period" and "transition period" interchangeably to indicate the beginning of the pandemic when live classes were suddenly replaced by online teaching following the outbreak of Covid-19. The survey started with a section that gathered demographic information about the respondents (Q1-3), followed by three main sections as:

- Part I: Teaching Online Before the Pandemic (Q4-8);
- Part II: Teaching Online During the Pandemic (referred to as disruptive period) (Q9-13); and
- Part III: Teaching Online After the Pandemic (Q14-19).

The survey also included a question asking whether they are willing to participate in a one-on-one interview to follow up on the survey results and provide more insights into their experience teaching online during the pandemic.

Phase 2: Semi-structured Interviews
Once the survey results were categorised, and faculty members willing to participate in semi-structured interviews were identified, faculty were contacted to set up one-on-one interviews to investigate these patterns in depth and gather faculty reflections on the imposed online learning situation. A total number of 15 survey respondents indicated their willingness to participate in a one-on-one interview, however, only 13 identified themselves by providing their contact information. The interviews took place in the Spring semester of 2021, one year into the pandemic. Interviews were scheduled for 30 minutes. Some of them were shorter while others took approximately 45 minutes. They were transcribed manually right after the interview finished to make sure most of the content was captured.

The interviews consisted of seven questions. The first question was used as an icebreaker to get the interviewee comfortable and set up the scene for the other questions. Q2-4 inquired about faculty online teaching experience during the disruptive period while Q5-7 collected faculty members' attitudes of online teaching post pandemic and their perception of the future of higher education following their experience. The interview generated a rich qualitative data that was coded in two phases using Atlas.ti. The first phase included open coding to uncover primary data and provide a map towards developing and defining specific codes that would help later in developing 11 categories that show the different stages of faculty online teaching experience during and after the pandemic.

Data Analysis & Ethical Considerations
Qualtrics was used to circulate the survey and collect quantitative data. Qualitative data from the survey open-ended questions and the interviews were coded in Atlas.ti to help in the analysis of the information and provide a complete picture of the current online learning situation.
Ethical approval was received from Lancaster ethics board and Weill Cornell Medicine-Qatar Internal Review Board (IRB) before conducting this study. A description of the aims of this study, the data collection and analysis process, along with a consent form were emailed to participants prior to collecting data.

Results

The survey yielded a total number of N=29 responses. The majority of the respondents taught a humanities and social sciences discipline (17 respondents; 58.6%) and 18 respondents (62.1%) did not teach online prior to the pandemic. It is worth mentioning that none of the 29 respondents who took the survey used to find online teaching easy before the pandemic. For the ones that taught online before the pandemic (11 respondents; 37.9%), the main challenge they mentioned is engaging with the students.

During the pandemic, 25 out of the 29 respondents (86.2%) had to teach online. The median number of courses they taught was three and all of them, except one respondent, confirmed having access to the resources they needed to teach online. IT department support was ranked top with 21 respondents (87.5%) followed by instructional design support (12 respondents; 50%). During the disruptive period, only 19 respondents (76%) confirmed seeking help, and again IT department seems to be the most sought after for help with 17 respondents (89.5%), followed by reaching out to colleagues (10 respondents; 52.6%), while six respondents (31.6.%) reached out to the library staff and five respondents (26.3%) asked instructional designers for help. Among the six respondents who did not seek help, five confirmed that they did not need it, while one respondent did not know how to access help. Consequently, 12 out of the 25 respondents who taught online during the disruptive period (48%) claimed having a good and excellent experience while 10 respondents (40%) had an average experience and three (12%) had a poor and terrible experience. However, in all three categories faculty still had challenges with student engagement.

Challenges with student engagement was a recurrent theme for the majority of the survey respondents. This is also shown in one of the six categories that emerged from data gathered from the interviews. Table 1 below provides the top five emerging themes from faculty answers. Beside these five top themes, it is worth mentioning that faculty members struggled with *students coming unprepared for live sessions* (1 recurrence), *not keeping up with schedule and deliverables* (1 recurrence), *students losing interest* (2 recurrences), and faculty members *feeling unable to help students who were struggling during this time* (2 recurrences).

Transition Phase Categories	Most Recurrent Emerging Themes	Frequency
Challenges with Student Engagement During Transition Phase This category is defined as the perceived lack of motivation of students, lack of preparedness, and gradual disinterest during the emergency online learning crisis	Faculty feeling disconnected from class/Lack of student live feedback	9
	Feeling of anxiety/uncertainty	5
	Students refuse to turn their cameras on	7
	Students lack motivation in large classes	3
	Students would not turn up for live sessions	3

Table 1: Emerging Themes from Challenges with Student Engagement During Transition Phase

Faculty also experienced challenges with online learning modality as indicated in the interview data, especially the *need for more preparation time and training on technological tools*, and the *lack of human interactions in online lectures*. Therefore, respondents provided some examples on how they modified their teaching approach to accommodate students' needs especially through *using the flipped classroom* modality (6 recurrences) and *working with smaller groups of students* (7 recurrences). Table 2 below summarises respondents' answers with the top four emerging themes for each category.

Transition Phase Categories	Most Recurrent Emerging Themes	Frequency
Challenges with Online Learning Modality During Transition Phase The difficulties faculty encountered: the absence of preparation time, issues with assessment, unfamiliarity with online teaching	Loss of the apprenticeship/Learning by doing element	5
	Need more preparation time/mastering technological tools for faculty	13
	Online lectures lack the human element usually present in live lectures	9
	Students high risk of cheating	4
Modifications to Teaching During Transition Phase The changes faculty needed to implement immediately in order to accommodate students' needs during the emergency online learning phase	Increasing class discussions	5
	Reducing live sessions/Replacing with PowerPoint	5
	Using the flipped classroom	6
	Working with smaller groups of students	7

Table 2: Emerging Themes from Challenges with Online Learning Modality During Transition Phase

Overall, less than half of the interviewees claimed that they were *satisfied with the quality of online teaching* during the pandemic (6 recurrences) as some have received *positive feedback from students* (3 recurrences). However, some required *more personal presence* (3 recurrences). It is also important to mention that some faculty found that teaching online had them *miss important teachable moments* that occur during face-to-face (1 recurrence), some of them found themselves *less active in online teaching* (2 recurrences), and had *doubts about the effectiveness of their online teaching* (2 recurrences) or were generally *unsatisfied with their online teaching* (2 recurrences), and finally two faculty members found that it was *easy to monitor students' engagement with their cameras on*. The top three emerging are shown in Table 3 below.

Transition Phase Categories	Most Recurrent Emerging Themes	Frequency
Quality of Teaching During Transition Phase Faculty perceptions of the quality of their teaching during the emergency online learning phase such as satisfaction, student feedback, and personal presence	Positive feedback from students	3
	Require more personal presence	3
	Satisfied with online teaching	6

Table 3: Emerging Themes from Quality of Teaching During Transition Phase

Few months into the pandemic, and as we wrapped up the spring semester where emergency online teaching took place, the majority of the respondents (n=18; 72%) confirmed a change in their perception of online teaching. Their answers were equally divided between positive (n=6), negative (n=6), and mixed (n=5) while one respondent did not answer this question. Still, more than half of the respondents (n=14; 56%) found it difficult and very difficult, while 9 respondents (36%) were neutral and only two respondents claimed finding it easy and very easy. This also impacted responses to whether they plan to adopt online teaching in the future, with only 10 respondents (40%) confirming their willingness to teach online, while eight respondents (32%) do not want to teach online in the future, and seven (28%) were unsure. Respondents who claimed using online learning in the future considered that a hybrid or blended model would be adequate, while others preferred online teaching for its flexibility, safety, and the availability of online educational resources that they were able to develop and use during the emergency remote teaching period. On the other hand, respondents who did not want to teach online in the future mentioned two main reasons. Half of the respondents considered that their discipline does not lend itself to online learning, while the other half saw the value in face-to-face teaching. Among the total number of respondents (N=25), 10 respondents confirmed needing assistance in building their online courses in the future especially from instructional designers (9 respondents) and IT department (9 respondents), while six respondents required more training and workshops and four respondents required library staff support. Finally, 11 respondents (44%) provided a positive attitude towards online teaching beyond the pandemic, while six respondents had mixed attitudes, six respondents had a negative attitude, and two respondents did not answer this question.

Faculty experienced a shift in their pedagogical approach following the emergency online learning phase. One of the common shifts observed through four recurrences is *breaking lecture and complex issues into small units to keep students engaged and making sure they digest the materials* as explained while five consider that there is a pressing *need to reconsider student assessment*, and three respondents found that *smaller classes are more conducive to online learning and engagement*. Few faculty also mentioned that they *became a facilitator rather than the expert* (1 recurrence), *had the chance to collaborate with other faculty and share ideas* (1 recurrence), *needed to be more available to the students through flexible office hours* (1 recurrence), and finally their willingness to *keep some elements of the online learning for future-face-to-face teaching* (2 recurrences), and to *provide a mix of synchronous and asynchronous instruction* (2 recurrences). Table 4 below summarises the top three emerging themes.

Post Pandemic Categories	Most Recurrent Emerging Themes	Codes
Shift in Pedagogical Approach Following Transition Phase Faculty reflections on their teaching practice in light of the emergency online learning phase	Breaking lecture/complex issues into small chunks to keep students engaged and help them digest the materials	4
	Need for rethinking students' assessment	5
	Smaller classes are more conducive to online learning and engagement	3

Table 4: Emerging Themes from Shift in Pedagogical Approach Following the Transition Phase

Finally, respondents' attitude towards the future of online teaching was gathered, and although a considerable number of respondents reported an equal number of mixed and negative attitudes (6 each; 24% each), a considerable number of respondents (11 respondents; 44%) had a positive attitude. This is reinforced with the interview results where the theme *positive experience with transition to online learning* had the highest number of recurrences (12 recurrences) compared to six recurrences for the theme *negative experience with online teaching and learning*. Below are their answers divided by *Positive, Mixed*, and *Negative* attitudes.

Faculty recognized some critical issues facing the *rigid, regimented, and* [the] *lacking innovation* [nature] *of the higher* education sector along with the *threat of budget cuts and the potential replacement of faculty with recorded lectures*, each having three recurrences. However, faculty also reiterated the *great opportunity online learning offers if well designed and delivered for certain types of students* (3 recurrences) along with the *need for rethinking different forms of assessment* (3 recurrences). Finally, while *technology should be used as a powerful/great/flexible tool for instruction* (7 recurrences) faculty *role, especially in-person teaching, is crucial in facilitating and directing students' learning* (9 recurrences), and the *need to rethink different forms of assessment* (3 recurrences), while *online learning offers a great opportunity if well designed and delivered* (3 recurrences). Answers are summarised in Table 5 below.

Post Pandemic Categories	Most Recurrent Emerging Themes	Frequency
Critical Concerns Towards HE Percieved obstacles to effective delivery of high-quality learning experience	HE is too rigid, regimented, and lacks innovation	3
	Worries about budget cuts/potential replacement of faculty members with recorded lecture	3
Transformation in HE Faculty perceptions of the future of HE in light of their experience with the emergency online learning phase	In-person teaching remains crucial in facilitating students' learning	9
	Need for rethinking different forms of assessment	3
	Online learning offers great opportunity if well designing and delivering for certain type of students	3
	Technology should be used as a powerful/flexible tool for instruction	7

Table 5: Emerging Themes from Critical Issues and Transformations in HE

Faculty Change in Perceptions

To assess if there were any changes in faculty perception of online teaching before and after the pandemic, a McNemar test was applied and a $p = 0.182$ indicates a slight increase in negative perception of online teaching after the disruptive period. From the total number of respondents (N=25), 12 (48%) stayed the same, four (16%) respondents experienced a positive increase in their perception and nine (36%) had a negative increase. Exploring respondents' perception of online teaching before and after reveals that there is a slight increase in the male respondents' negative perception of online teaching following their experience during the disruptive period while there was no significant increase in female perception. Furthermore, a Fisher test was applied with p = 0.12 before and p = 0.465 after which indicates no significant difference between gender and perception of online teaching.

Faculty Change in Experience

Using McNemar test to measure the change in faculty online teaching experience, out of the total number of respondents (N=29) who completed all sections of the survey, result ($p < .001$) shows a significant increase in negative experience among respondents who have taught Before (37.9%) and During (86.2%) the pandemic.
It can be noted that those with *Excellent Experience* were significantly more likely to perceive online teaching as *Easy or Very Easy* (50% versus 0% for those with *Good* or *Average and Lower)*. A Fisher test was applied with p=0.019 which indicates no significant difference between respondents' experience teaching online during the pandemic and their perception after the pandemic. Table 6 presents the corresponding values.

Perception After	Experience During					
	Excellent		Good		Average or Lower	
Difficult/Very Difficult	1	25.0%	3	37.5%	10	76.9%
Neither Difficult Nor Easy	1	25.0%	5	62.5%	3	23.1%
Easy/Very Easy	2	50.0%	0	0%	0	0%
Fisher Test	$p = 0.019$					

Table 6: Faculty Experience During the Disruptive Period and Their Perception After

Need for Help in the Future

When comparing respondents' answers regarding their Need for Help during the Disruptive period and in the future, there is a significant decrease in their need for help in the future. Seven (46.7%) out of 12 respondents teaching in the Humanities and Social Sciences require help while only two (20%) out of 10 respondents teaching in the Sciences and Engineering require help with their future online teaching.

Attitude Towards the Future of Online Teaching

The majority of respondents who had an Excellent and Good experience teaching online during the disruptive period reported a Positive attitude towards online teaching in the future (6 respondents; 28%). It is also worth

noting that among the respondents who reported an Average or Lower experience teaching online during the disruptive period (12 respondents; 48%), almost half of them (5 respondents) reported a Positive attitude towards online teaching in the future.

Discussion

Networked learning, with its five essential elements (Networked Learning Editorial Collective, 2021, p. 319), can create a suitable environment to integrate the human part with the technological part for an ultimate online learning experience. First, the "processes of collaborative, co-operative and collective inquiry" brings the community together as partners in the learning experience. Second, "knowledge-creation and knowledge action" that are at the heart of the learning activity, when supported by "trusting relationships" and "a sense of shared challenge" reinforce the sense of community, trust, and identity. Finally, when these elements are "enabled by convivial technologies" the learning experience becomes more accessible and cost-efficient to community members. The following section analyses and discusses the findings based on these five elements.

Online Teaching more Difficult than Previously Perceived

The majority of the survey respondents perceived online teaching before the pandemic as a neither difficult nor easy task even though very few of them had experience teaching online before the pandemic. Furthermore, less than half of the respondents with online teaching experience prior to the pandemic described their experience as good or excellent. However, the main challenge was engaging with students and engaging students with the content. This experience has urged faculty to make student engagement a priority for the fall semester which explains having it on top of the list with 71% responses in August 2020 survey versus 57% back in May 2020 followed by "providing timely feedback for students" with an increase of 11% for August 2020 (Lederman, 2020).

During the emergency online delivery, even though faculty had access to resources and academic support to facilitate online teaching especially IT department and instructional designers, and while zoom was used as the main teaching tool, a considerable number of faculty experienced absence or limited expertise and support form IT which explains why they had to ask colleagues and librarians for support and assistance. This correlates with previous literature on the challenges faced when trying to integrate technology in teaching especially faculty members' lack of preparation time and issues with access to hardware and softwares to facilitate online teaching and learning (Newland & Byles, 2013; Reid, 2014; Horvitz et al., 2015; Wichadee, 2015). Furthermore, the majority of faculty seem to struggle with engaging students, while a few were worried about academic integrity, fair assessment, and increased workload which was also described by Keengwe and Kidd (2010) as a perceived threat to faculty's "autonomy and control of the curriculum." Therefore, a successful online learning experience necessitates a responsive learning management system infrastructure and an unwavering IT support endorsed by the administration (Iglesias-Pradas et al. (2021). These essential elements "enabled by convivial technologies" make the learning experience more accessible to community members (Networked Learning Editorial Collective, 2021, p. 319), less overwhelming for faculty members, and more engaging to students.

Faculty Use of Creative and Innovative Teaching Approaches

"Knowledge-creation and knowledge action" are at the heart of the learning activity, and when faculty build "trusting relationships" and create "a sense of shared challenge" with their students, they reinforce the sense of community, trust, and identity that is inherent to learning (Networked Learning Editorial Collective, 2021, p. 319). Nevertheless, faculty were resourceful trying to adapt to the emergency online teaching situation by adapting a creative approach. Thormann and Zimmerman (2012) have shown that faculty' resistance to adopt technology is not a result of their lack of technological proficiency but a lack of time for training. While most of the faculty decided to divide their students in small manageable groups, using breakout rooms to facilitate group work and discussions, others were using the flipped classroom modality to make better use of live class time. This approach connected the instructors to the learners by replicating some level of "human-human interaction" that is necessary in a networked learning environment (Goodyear, 2005; Tu, 2002). Some faculty were also using creative assignment and assessment tools by replacing outdated quantitative quizzes and assignments with qualitative work such as literature reviews and discussions that engage students with more critical thinking and information synthesis.

Despite some concerns about the lack of human interaction that might lead to missing important teachable moments that are believed to be key in any learning, this transformation in teaching and assessment led some faculty to feel satisfied about their experience during the pandemic. The pandemic offered faculty an opportunity

to rethink their teaching content and design learning activities and assessment techniques that allow students to feel engaged and connected (Carvalho & Goodyear, 2014; Boud & Prosser, 2002). Some faculty were happy about the content they have put together and are planning to keep on using it once we go back to 'normal days' and they also mentioned that their students' feedback regarding the course was positive. The literature has found that the increased positive attitude towards online learning following the pandemic comes from the perceived flexibility and cost saving on using online resources (Lederman, 2020).

Online Learning and the Future of Higher Education

There is still a mix of positive, negative, and neutral attitudes towards the usefulness and applicability of online learning. Even though a considerable number of faculty consider that their disciplines do not allow for online learning, saw value in face-to-face teaching, and were concerned about providing fair and equitable student assessment,some faculty seem to appreciate the experience as it opened the way for them to try new teaching approaches, use new technologies, and integrate new assessment techniques that they would have never considered if it was not for the emergency online teaching. This shows that if higher education wants to create a successful and responsive learning experience, it should bring the community together as partners in the learning experience encouraging collaboration, co-operation, and a collective inquiry (Networked Learning Editorial Collective, 2021).

Finally, some faculty called for integrating both approaches - online and face-to-face, synchronous, and asynchronous - to create a blended teaching and learning environment, where faculty and students can find a balanced environment that supports the different needs of the community. This blended approach would bring the best out of an asynchronous environment - that is found to improve higher order thinking skills and may result in better student outcomes (Breirton et al., 2021; Bernard et al., 2004), - along with a synchronous environment - that would support faculty need for face-to-face - to build interpersonal relationships and improve collaborative engagement while utilising digital technology to facilitate access. It is hoped that higher education in its improved post-Covid-19 model follows an inclusive approach to teaching and learning that embraces online learning while creating a global network where "humanity is at the centre of educational technologies" (Networked Learning Editorial Collective, 2021).

Conclusion and Limitations

This case study investigated faculty attitudes, preparedness, and response to adopting technology-enhanced learning during the 2020-2021 pandemic and examined the impacts of this shift on student learning from faculty perspective while exploring the implications of this shift on networked learning research and practice. Few limitations should be taken into consideration when replicating this study, especially the context-specific nature of the study that takes place in a relatively new higher education setting in the Arab Gulf region. Therefore, the sample size is limited and might not allow generalisation of the results on a larger scale. However, when results are compared with the recent literature on online teaching during the pandemic, most of the findings correspond, to a certain degree, to the general attitudes of faculty members and describe some common challenges and opportunities for the future of higher education.

Despite the limited sample of survey respondents, the interview generated a rich set of data that informed this case study and provided a map of the online teaching challenges and opportunities in TNHE institutions in Qatar. First, faculty experienced a slightly negative increase in their experience of online teaching following the pandemic. However, the majority still hold the same perception about online learning as a neither difficult nor easy task. Second, those with good experience teaching online perceive it as an easy task and showed a positive attitude towards the future of online learning. Third, it is also important to note that faculty perceive the usefulness of online learning based on the disciplines they teach. Some of them consider their discipline to require face-to-face teaching which is a finding that needs to be investigated in the future on a discipline basis.

Therefore, based on the results drawn from this study, we can conclude that online teaching is not an easy transition and requires a lot of planning, content building, and different assessment tools. Furthermore, faculty calls to consider the use of blended learning in the future is a proof that online learning is here to stay. These challenging times have instilled a sense of creativity and innovation and proved that faculty members can adapt to change and are willing to take this further beyond the pandemic to ensure students have a positive, rich learning experience. Whether we consider online learning as a temporary solution or as the future of education, it must be integrated in faculty professional development (Hodges et al., 2020). "It takes a village to raise a child" is especially true to online education where the community, including administration, faculty, support staff, and students need to come

together to plan, implement, assess, improve, and support a sustainable, inclusive, and successful online learning experience.

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How Networked learning can facilitate professional development?

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Abstract

In this review article, our main goal is understanding the Networked Learnings used for professional development. Networked learning can be defined as a form of learning where information and communication technology (ICT) can be used to promote connections between learners and their peers, learners and tutors and learners and learning resources. Such networks play an important role in professional development of employees in different sectors, from high tech industries to traditional businesses, and in both formal teaching and educational programs and informal learning activities. In this review, we explore how networked learning contexts, domains, and levels of scale are practiced and reported in the academic literature. And finally, we will investigate support technologies that have been used to facilitate networked learning for professional development.

Keywords

Networked learning, professional development, value creation, Technology Enhanced Learning

Introduction

We are living in an era of constant change and transitioning which for example is experienced at work, by global challenges, and through transforming technologies (Jakupec & Garrick, 2000). These changes and challenges bring us many opportunities for growth but also require us to tackle many work-related and professional issues. Issues that more often than not involve learning and development and require continued or lifelong professional learning to support capability development. The Building Energy Management System (BEMS) within the Heating, Ventilation, Air Conditioning (HVAC) sector is one of the professional sectors which has been significantly affected by transition at work. This sector is becoming increasingly complex, and it is facing significant challenges related to the energy transition. For example, stricter energy performance regulations and higher comfort expectations make the buildings more heavily equipped with complex (smart and/or digital) systems which often generate larges volumes of data. Because of those developments in the sector, knowledge about HVAC systems alone is no longer enough. HVAC consultants, contractors, and maintenance companies are suddenly expected to have knowledge about data management and data analytics techniques (Ligtvoet et al., 2016, Radar 2020, 2014). Transition skills such as problem-solving, critical thinking, creativity, and the ability to collaborate (Topsectoren & PBT, 2017a; 2017c), and technical skills like data analytics and machine learning are becoming increasingly important. In the context of such changes in the sector, there is an urgent need to reflect on lifelong learning and practices in the sector.

Lifelong development can be considered as “all learning activities that are undertaken throughout life, with the aim of improving knowledge, skills, and competencies within a personal, civic, social and/or employment-related

perspective" (Commission of the European Communities, 2001, p. 9). It concerns adult learning, whether in formal and informal learning pathways and whether concluded with a diploma or certificate (Gielen et al., 2017). To enhance lifelong development, people must have the opportunity to participate in learning and be willing to learn (Topsectoren & PBT, 2017b). The possibility to participate in learning is related to the ability to learn, the type of profession, work environment, financial resources, available time to learn, information provision, and the connection to the demands of both the employer and the employee. Because of more dynamic job profiles as also the distribution of jobs between humans and robots, there is a noticeable focus on learning and professional development in the workplace (Topsectoren & PBT, 2017b). The use of learning communities and learning networks can strengthen the capacity of individuals and organizations to learn (Topsectoren & PBT, 2017; 2019). As Lave and Wenger (1991) describe, learning communities have been used for a group of people who interact regularly, share the same concern or passion for something, and they aim to improve thier knowledge and practice. Networks of Practice (NoP) or learning networks (Seely Brown and Duguid, 2001), have been used to describe a more informal and developing social network that encourages and supports the sharing of knowledge and information between a group of people who gather around the same practice and profession. Seely Brown and Duguid (2001) and Wenger, Trayner and De Laat (2011) claimed that there are a few differences between learning in networks and learning in communities of practice. First, in Networks, the relationship between network's members is more informal and intimate in comparison with communities. Second, powerful interpersonal relationships and group unity are shaping the fundamentals of communities, while networks are more widespread, and the relationships can be weak or strong. And finally, relationships in networks can be temporary, but in communities, people tend to form a more permanent and lifelong connection. Also, as mentioned in "Networked Learning: Inviting Redefinition" (2021), "Networked Learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies. Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources, and solutions, across time, space and media" (p. 319).
In this research, we combine theories and principles from the field of networked learning with challenges and transition in lifelong development. Within networked learning, forms of social learning related to informal learning can exist in various configurations, such as field labs (e.g., Stolwijk & Seiffert, 2016), living labs (e.g., Maas et al., 2017; Nyström et al., 2014), Collaborative Innovation Networks (e.g. Xie et al., 2016), and Centers for Innovatief vakmanschap (English translation: Innovative Craftsmanship) at vocational schools (e.g. SBB, 2020). Examples of learning communities related to formal learning are, employees who take a course together or with their peers to be informed about developments in their field. And in all these different learning processes, emerging technologies can help in both facilitating the access to educational resource and communication between learners. But in this research project, we mostly focused on the networked learning framework because the way HVAC is currently organised is more similar to network principles instead of community organisation.

Therefore, in this review article, we try to investigate current developments in the field of networked learning, and continued professional development to explore how this can support emerging needs for lifelong development and learning in the HVAC sector.

Methods

Search and Identification Process

In this research, PRISMA guidelines (Page et al., 2021) for conducting systematic reviews have been used to report the results of study in a systematic way. We used three different search engines Web of Science, Scopus, and Pubmed to find relevant articles. Our keywords include "Networked Learning" and "professional development", and all articles between 1998 till 2021 have been covered. We included the research that our mostly focused on professional development of employee, followed the experimental methods. And the articles which they focused only on primary education, and technical computer science methods (e.g., neural network analysis) were excluded. The results of the search findings are presented in figure 1.

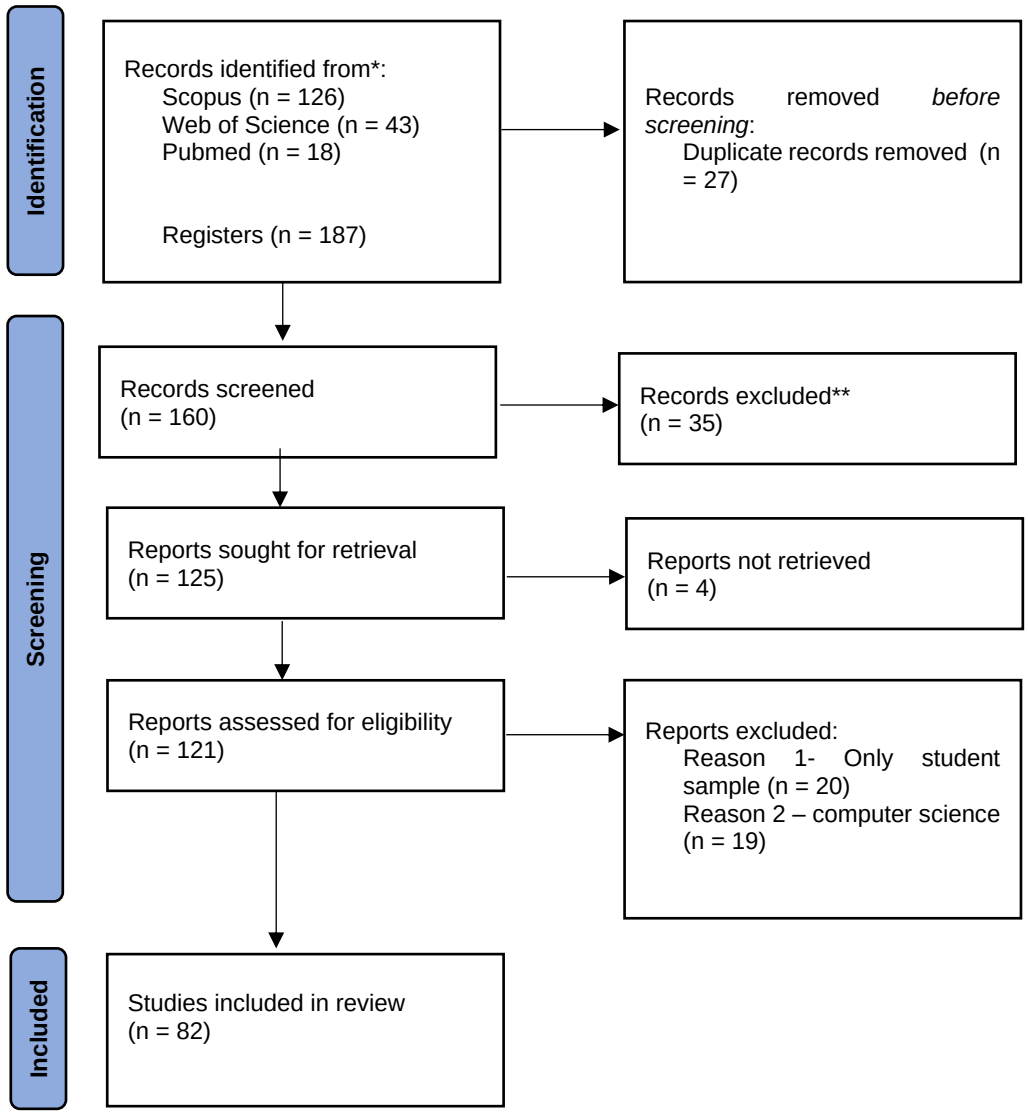

Figure 1: PRISMA table.

Apraisal: Screening and Selection Process

The titles, abstracts, and keywords of the search results provided by search engines were checked for selecting the relevant publications. Also, during the screening process, a few supplementary references were included based on a search of the reference list of papers. The results are presented in figure 1.

Results

To understand how the literature can support emerging needs for lifelong development and learning in the HVAC sector, we categorize our findings as follows. First we describe networked learning contexts, followed by social and individual attributes of networked learning, networked learning domain, and finally mechanisms and design features that support productive networked learning practices**.**

Networked Learning Context

The literature we reviewed shows that professional learning can take a place not only through formal setting, like organized workshops, conferences, and classrooms, but also it might be a part of everyday working of professionals (Eraut, 2004, 2007, 2011). Such informal learning can happen during the face-to-face communication of employee, observervation of more experienced colleagues or any other form of unintentional learning beside working

(Felstead, Fuller, Jewson, & Unwin, 2009; Tynjälä, 2008). These informal learnings are mostly invisible to managers, organizations, and professionals as a form of professional development (Milligan, Littlejohn, & Margaryan, 2014) and it considered as a "huge mass of iceberg" (Vaessen, 2014) because mostly such informal activities are invisible and spontaneous (De Caluwe and Vermaak, 2003; De Laat, 2012). Although it is mostly unknown for organizations, but often it is at least as influential as the other form of formal education (De Caluwe and Vermaak, 2003; De Laat, 2012).

In general, both formal and informal form of learning can be important for professional development. For example, Bautista et al. (2021) shown that for art specialists and music teachers both formal and informal education needs be seriously considered by policy makers. Vaessen et al. (2014), also explored the relationship between formal and informal professional learning of teachers. And finally, instead of conflicting formal with informal learning, we should highlight the need to develop a "hybrid form of learning". With this approach both formal and informal activities recognised, respected, and promoted (McGuire & Gubbins, 2010; Vaessen et al. 2014) and formally supported/implemented by organisations as forms of learning and professional development (De Laat, 2012).

Networked Learning Social and Individual attributes

According to Vaessen et al. (2014) Networked learning can promote different social and individual attributes. For example, by providing a networking and communication opportunities for people to connect and learn with other professionals, networked learning can provide more professional autonomy, freedom of choice, commitment, responsibility, accountability, power, control, trust, communicative openness, and interest to share and provide feedback. On the other hand, it can also provide collaborative atmosphere in the organization, and increase the chance of success of networked learning activities (Vaessen et al. 2014).
In addition, networks can also create an opportunity to link to other professionals outside of the direct working environment by creating the freedom of choice (cf. Büchel & Raub, 2002). This option which enables you to choose what you want to learn can improve a person's performance (Akkerman, Petter & De Laat, 2008), because it is believed that such freedom can brings a feeling of responsibility and increase personal motivation (Varga-Atkins et al., 2010). Oddone et al. (2019), explored the role of autonomy within the professional learning networks of teachers and claimed that teachers experience autonomy in learning networks as linking (choice and control), stretching (an expression of self as teacher and learner) and finally amplifying (an expression of self as individual). Also investigating the networked learning in continuing medical education, show that educational networking and communication between professionals can encourage learner engagement and commitment to practise improvement (Margolis et al., 2015). Especially, "interactivity conducive to learning and behaviour change" in professional learning network can be facilitated with trusted relationships and freedom to express their concern or dissatisfaction with peers (Parboosingh et al., 2011).

Networked Learning domain

Networked Learning has been used in a wide range of domains like, higher education, management and organizational learning, workplace, and continuing professional development. But one of the main domains of networked learning application is in professional development of teachers where they can expand their relationship in and outside of their school's network to learn, solve their everyday problems and innovate in their teaching (De Laat, 2012).

In the last few years, more digital technologies have been used for teachers professional learning that can cross the boundaries of school's limitations. ICT can enable the teachers to remain connected with their professional learning network regardless of their geographical limitation (McGregor et al. 2004, 2006). As an example, we can mention about the TeachConnect platform that provide community support for teachers (Kelly, 2018).

Mechanisms and design features that support productive networked learning practices

Different mechanism and design features can support network learning and its value creation. We can argue that the recent progress in networked learning field has been largely influenced by understanding and development of technologies to support networked learning and moving from traditional way of learning to a more innovative, technology-based learning. Lee et al., (2020), reviewing empirical research revealed a few important factors that can influence member's engagement in knowledge creation in online learning communities and networks. Structured approach (for example, Bedford, 2019): argue that incorporate structure and having a timeframe for online professional learning network can be beneficial. Organizational support: we already observed the importance of organizational support in our interview with different companies involved in TransAct project. Our

interview revealed that imagining success for online learning networks in organizations without managers or leaders support, is out of reach. Conducive environment: as we also discussed earlier in social and individual attribute section, psychological characteristics of professional network members can highly influence the success of learning networks (Owston et al. 2008). Culture of sharing: this feature of online learning networks that professionals are actively engage with sharing and it is also appreciated by the organization can promote network learning between professionals. Shared ownership: It can have a significant effect and explore whether there is a sense of a personal value in the online learning networks and co-ownership of common goals such that members find may value and perseverance in engaging in online knowledge construction.
Beside that there are a wide range of web technologies that have been used for facilitating the networked professional learning; from a local website that professionals can communicate with each other using email messaging, chat, or discussion forum to a more national or international platforms that they provide video cases, lesson plans, and many different teaching and learning activities (Lock, 2006; Powell & Bodur, 2019).

Discussion

Professional networked learning is situated within a broad economical, societal, and educational context. Answering this question that whether and how networked learning can be considered and being developed in the professional working environment of expert in the high-tech industries like energy management sector can be challenging. By critical reviewing the literatures and exploring what have been so far achieved in the field of networked learning, we are able to take the next steps, fill in the gaps in research and implement new ideas.

Now, the energy transition is on its fast speed. Distribution of technical knowledge and experience is needed and continuous professional development of the current workforce, and educating the new employees is crucial. That is the main reason which we have conducted this research to be able to develop a conceptual model of networked learning which can help tackling these educational challenges. These days, many educational and research institutes in the Netherlands have tried to develop a formal form of learning communities and networks to help the energy transitions (Topsectoren & PBT, 2017c). We discussed the importance of both formal and informal networked learning activities (Brown, Collins & Duguid, 1989). Organizations that only focus on formal education and ignoring informal learning may miss a big and important aspect of professional development. On the other hand, considering only informal learning for professional development can be misleading. Therefore, as it is also suggested by McGuire & Gubbins, 2010, we recommend a hybrid form of learning where both formal and informal is recognized and respected. High tech industries like HVAC, cannot unlock their potential by focusing on one form of networked learning and ignoring the others.

In both formal and informal learning networks, different social and individual attribute can be important and affect the productivity of such networks. Different aspects like level of control on the learning process and autonomy, self-directedness and independent decision-making can change the direction of networks (Vaessen, 2014). We see that freedom for professionals to choose the areas to explore can improve their performance (Akkerman, Petter & de Laat, 2008). Also, research in professional development of teacher shows that how important is the role of organization culture in providing the opportunity to develop (de Laat, 2012). Organizations with hierarchy and more centralized culture can negatively affect the possibility to learn from more senior experts (Pahor et al, 2008). Hence, policy makers and strategist in the energy management field needs to consider these important social and individual attributes in their future decision and consideration for designing a professional learning network.

We strongly believe that professional learning networks in HVAC sector can be inspired and learn from other domains. Professional learning networks have been used in the field of professional development of teachers (e.g., Pettersson and Olofsson, 2019; Spante et al., 2019; Oddone et al, 2019; Bautista et al., 2021) ZooCamp educators, (Khalil et al, 2017) and continuing medical education (Margolis et al., 2015). Each of these networks has it own specific features, but the fundamental idea behind all of our same and is generalizable to the other networks. Therefore, by reviewing these different professional learning networks in different domain we can explore the current initiatives, barriers, and opportunities of network learning designs and implement them in HVAC sector.

Finally, this literature review is not only providing a comprehensive overview of current statue of networked learning research, but also it can help us to develop a conceptual model that can help the energy management system experts in the HVAC sector. Our practical model focus on hybrid form of network learning where the freedom of choice and trust between the participants of the network is respected, and organizational culture facilitate this type of learning.

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Connecting Workshops in Digital Education

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Abstract

Communication, production, experiments and play in networked learning can be so much more than just having meetings on Zoom or Teams. This text sketches out some possibilities and ways of understanding this. The text is organized in three parts based on both finished research and ongoing research since 2004. The first part presents an overall pedagogical framework in the form of a media ecology of communication and production between schools or pre-schools. The second part has to do with how a group of children and teachers can understand themselves as an experimenting community in open laboratories. Finally the third part sketches out how the actual ways of communication and production can take place in different forms of common synchronous and asynchronous workshops.

Keywords

The Flexible Meeting Place, Experimenting Communities, Open Laboratories, Platforms for creativity

Background

I base my text on several research projects and processes of developing teaching, that focused on creativity and learning through connecting across time and space. I have since 2004 conducted practical research in the field of online communication, experimenting and playing, that has involved children and pre-school teachers (Thestrup, 2019; Bølgan, 2018). It has taken place in a national project like *Formation in a Digital and Global World* in 2015 (Thestrup et al, 2015), where 17 Danish kindergartens communicated using the software Google+, today reframed as Currents. Another has been *ASSIST*, 2017-2018 (Thestrup, Gislev & Elving, 2018; Gislev, Thestrup & Elving, 2020), where teachers in larger schools in Denmark worked together with teachers in remote schools on subjects, the remote schools could not offer. The research also took place in European projects such as *mediaPLAYINGcommunities*, 2007-2009 (Støvelbæk, 2009), where pre-schools started to establish to go beyond an understanding of their pedagogical practise as only limited to each institution. Finally I have been part of the international project *The MakEY Project* in 2017-2019 (https://makeyproject.eu/), where among other things three schools in Denmark, Great Britain and Australia tested how to communicate and experiment together online (Thestrup & Pedersen, 2020). It is important to mention, that students, pre-school teachers and teachers have been involved in these projects and have taken part in the different actions during the communication, playing and experimenting. This has not included processes where the children involved acted on their own in non-formal contexts.

The basic research question has over the years been the same: *How can children and professionals in pedagogical institutions communicate, experiment and play together globally?* The research methods have been inspired by action research (Duus et al, 2014) including participatory observations (Kristiansen & Krogstrup, 2012) and interviews (Kvale & Brinkmann, 2015). The researchers, consultants in municipalities and project leaders involved have often taken an active part in the actions in the actual pre-schools. This has over the included planning, joining the pedagogical processes, documenting using visual methods (Pink, 2013; Henningsen 2005) and reflecting upon the experiences.

The figures in this text are one of the results of the different research projects but has also over the years informed the ongoing research as it unfolded. The attempt to connect through communication, playing and experimenting have unfolded across time and space in educational settings and draw upon the ideas of blended learning, where the education is partly physically based and partly virtually based. It also draws upon networked learning (MacKenzie et al, 2021; Gourlay, L., Rodríguez-Illera, J.L. *et al*, 2021), where focus is on how one makes people work together in networks. It could also simply be called digital education (Bayne et al, 2020), based upon that *"…teaching is a highly contextual activity bringing together people, texts, images, locations, objects, technologies, and methods in many different ways."* (Bayne et al, 2020, p. 5). The important thing about this definition is that

the teaching, the common production and the communication can take place in many different ways and not in a few already defined and framed ways. It is a digital education, as the communication across time and space in a global network would be difficult without digital technologies. Whether one seeks to establish local networks or seeks to combine the local and the global, it all depends on the many different tools used, the situations of the individual students across the globe and who the actual teachers are. What is common for all the different formats is that digital education is understood as a way, where a collective to work together in an emergent form. The participants construct ways to engage and communicate an even make education accessible to as many as possible (Bayne et al, 2020, p. 9). To use the term digital education does not exclude using analogue elements or the use of local physically based places. It implies that the connection between people, when establishing networks across time and space almost certainly has different kinds of digital elements incorporated in educational contexts.

Part one: The Flexible Meeting Place

The first part is a concept about establishing the overall pedagogical framework around networked learning with someone outside the local school, classroom or kindergarten. In that regard communication is more than talking to each other on Zoom. It is of course an important part, but there are more options when trying to establish collaboration across time and space. And even talking together can take many forms and take place in many formats. The synchronous conversation can be part of a much larger pedagogical construction including both asynchronous elements and the use of both digital and analogue materials, tools, spaces, processes and of course the intentions behind it. One way of understanding it is to perceive the process behind the actual configuration of a pedagogical format as *a flexible meeting place* (Thestrup, Gislev, & Elving, 2018). The idea is simple: whatever form of communication, that takes place in any kind of chosen software, it is the result of experiments and reflections upon the communication itself. The users of the software find specific uses in a social and cultural meaning making process. They try out, use and leave software, that does not fit their interests. They combine digital and analogue, online and offline, synchronous and asynchronous in processes, that support exchanging and experimenting. As a result the flexible meeting place might alter over time depending on the ongoing reflection between the participants using and creating the meeting place.

The concept of the flexible meeting place can be illustrated in figure 1. below. The yellow circles are each of them an experimenting community and they meet in the inner blue circle through a number of meeting places, that can be both analogue and digital or a combination. These meeting places can be changed and used for other purposes, if needed be. The outer blue circle demonstrates that the two experimenting communities have a common project, but also do things on their own without involving other groups. Therefore the blue dotted line goes down through the middle of the two yellow circles indicating this.

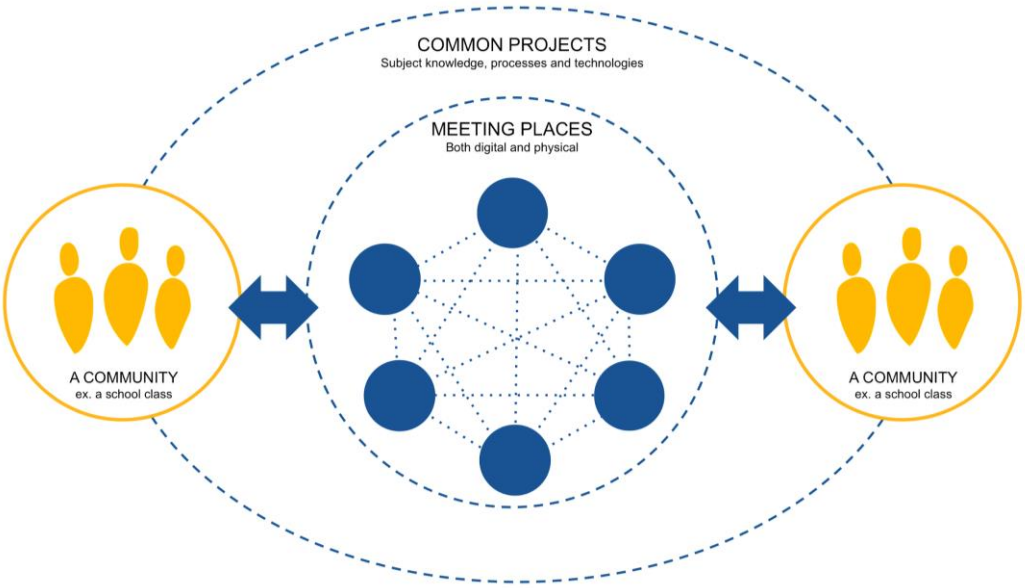

Fig. 1: The Flexible Meeting Place (Thestrup, Gislev & Elving, 2018)

Please notice that the model says nothing about the specific activities in every single meeting place or for that matter the organization of the actual processes in and between the meeting places. It can be in the form of synchronous or asynchronous communication, analogue or digital including experimenting, playing, chatting, storing, sending and showing using screen, body, space and face. Workspaces, makerspaces and playgrounds can be part of the media ecology as well as the ordinary classroom or lecture hall. These areas can be part of a formal educational system as well as informal areas understood as *third spaces* between schools and home (Potter & MacDougall 2017). This media ecology can unfold in many formats. It might be webcams on mounts that show ongoing physical processes and materials, forums, where inspiration can unfold through text and images, scissors and pens, that together with online editing tools shape narratives and understandings of technology and media. There are many options that can be combined according to the interests of the participants. The connection between people and places happens in several ways including body, objects, spaces and screens and can be framed as a *media ecology* (Postman, 2000), which has to do with the study of media as an environment (Scolari, 2012; Strate, 2006). Media ecologies can be seen as a dynamic and constantly changing aggregation of media wherein existing practices transform or new practices emerge.

The flexible meeting place is not the starting point for establishing communication. This starting point might be quite different Therefore on might talk about establishing a school establishing flexible meeting place with other schools in four phases (Gislev, Thestrup & Elving, 2020). In the first phase a school might not experience, that they are part of any networks, even though individual teachers and children are due to being this because pf their own use of mobile phones, tablets or laptops. Some teachers might even have started using the internet while teaching, but the school administration does not know much about this. As the there exists a vast and global network around the school, one might call this first phase *The Potential Connections.* The teacher and children in the school class need to find someone to establish contact with or something to be inspired or challenged by. In this phase, the teacher and the class is probably quite occupied by looking for someone or something. Probably the first attempt is simply to follow somebody on one or another kind of social media.

The second phase could be called *Establishing Contact*. That would be when the teacher or the class actually get some kind of contact and start establishing some kind of collaboration through a very limited set of communication possibilities. An example of this could be talking together on a video channel. Probably one can´t talk about a media ecology, as it is too early to establish a practice. But there is happening some kind of exchange between two partners and a media ecology can become a possibility. The third phase is then *The Flexible Meeting Place*, with a media ecology defined, used and changed by the partners in this particular network as the model above visualizes.

The fourth phase could be called *Meeting Places in Networks*. Here the teacher and the class and school have many different collaborations in many different networks. In some situations the class is still searching for information as in the first phase. In others they have established contact and in others yet, they have developed a flexible meeting place. The four phases are constituted of the establishing of one or more media ecologies, but also an awareness of being part of a global, vaste and everchanging network. The teacher and class simply see themselves as individuals and as a class as part of this network of possibilities. Some of these possibilities, they create themselves, others they take part in and develop further. The awareness changes from phase one to phase four even though the teacher and the children might experience many situations in the future, where they have to start from the beginning establishing collaboration. A part of being in this fourth phase is that they play different roles in different networks but is aware of it and start to know how to establish exchange of questions and knowledge through being connected.

Part two: Experimenting communities in open laboratories

This part is a concept about how a teacher and a class can understand themselves when developing the flexible meeting places, they are becoming part of. The teacher and the class can be understood as *Experimenting Communities* (Caprani & Thestrup, 2010; Shumar, Robinson & Thestrup, 2021). That is a group, where the core of the activities in the group are primarily to experiment and not only to repeat existing everyday practice around the use of digital media and digital technologies. The point is to invent new practice that becomes part of everyday life in the community. The community might already have a practice around how to use and change media, technology and narratives and the result might even be, that a repetition of an existing practice or adapting a slight correction seems to be the best solution. But there is a pedagogical process where the participants in the experimenting community ask themselves in what way the given technology, media or narrative would make sense for them to use (Dittert, Thestrup & Robinson, 2021). One answer here might even be, that it does not make sense and therefore won´t be used. At the center of the pedagogy is also an understanding of culture as a meaning-making

and creative practise (Gauntlett & Thomsen, 2013). Culture can also be seen as emerging and relational (Jantzen, 2005; Jantzen, 2013; Nielsen et al, 2019), which has the potential, that meaning is established over time through common action in the community itself.

The community experiments in *Open Laboratories* (Thestrup & Robinson, 2016), that are open in several ways. In the open lab it is not decided in advance what materials, tools, processes and spaces to use, how or for what purpose. This means first of all that digital and analogue materials are intertwined in processes, where it no longer matters, where it came from, but what the actual combination might consist of. There is in principle no hierarchy between processes and traditions. Everybody involved must be part of the common research process when experimenting and during this process be open for other suggestions and attempts.

Fig. 2 below demonstrates a possible process in the open laboratory. A, B and C to the left in the model illustrates existing use, experience on and points of view upon certain media, technologies and narratives. In the open laboratory A, B and C are brought together and a new practice might emerge from this meeting place, in this case named as D. This new practice is then developed to be the common practice in the community after and outside the open laboratory has been at work.

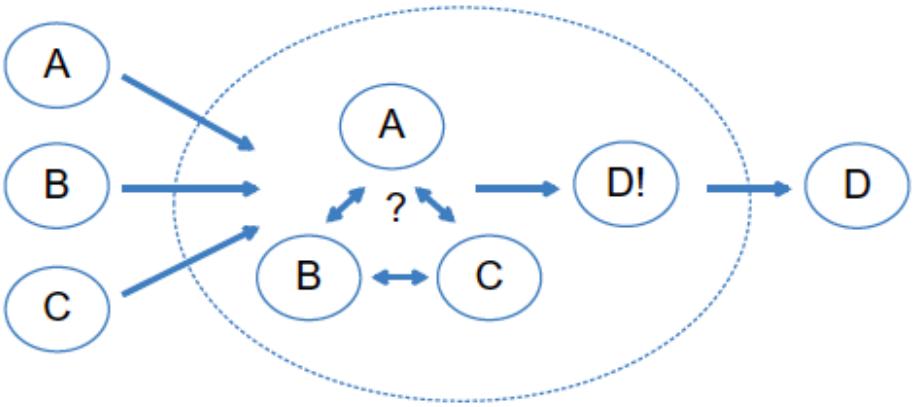

Fig. 2: The process in The Open Laboratory (Thestrup & Robinson, 2016)

As part of the open laboratory both physical and virtual spaces are linked together in processes, where both the physical and the virtual space are important. In both spaces, the materials, tools, bodies, narratives and the space itself are unfolded according to the possibilities and the intentions but they also support, inspire and potentially change the processes in the other spaces. So the open laboratory is a way of organizing the connection between different parts of a common space into a meaningful combination and not whether it is a physical space or a digital space.

The concept of the open laboratory derives originally from discussions on how one should define drama and theatre and one answer to this was the idea of the open theatre, where no drama and theatre traditions in advance were expelled and that included even the use of digital media (Lehmann & Szatkowski, 2001) with this background the open laboratory inherits the use of space, body and fiction together with digital media, narratives and technologies and like children´s own play becomes multi-modal (Cowan, 2017) and a space of connections and transformations. The consequence of this is that the participants in the open laboratory need to be open to each other. Tools, materials and spaces might be used in different processes by different people. This also means that the actual places to meet between different schools can take place in many forms. The participants try out and reflect upon how a way to meet, experiment and produce could be done. Each teacher and class in a network will have their own experiences and ideas to offer in the open laboratory but will encounter others in the process. The structure and content of one or more actual meeting places in a media ecology are not given in advance. Part of the activities in any given network has to do with being reflective in and upon the practice being established. The pedagogy when establishing networks is grounded in two basic questions: One on the themes and content involved and one on the pedagogical methods and principles themselves.

The experimenting community in the open laboratory is related to the community of practice, but at the center of the experimenting community is the will to look for new practice. As such the experimenting community is closer

to social learning, where the participants want to make a difference in the world, than the community of practice, that tends to focus merely on the participants in the community and repeats an established practice (Wenger-Trayner & Wenger-Trayner, 2020). The experimenting community is open to knowledge construction with others through being connected.

Part three: A platform of workshops

This final part adds workshops to the flexible meeting place and how one could use these to support the experiment communities in the open laboratories using digital media and technologies. One can understand and use the meeting place as a platform for creativity (Gauntlett, 2015; Culpepper & Gauntlett, 2020), where the contribution of the participants are celebrated, ideas and expressions invited and valued. Basically the area of experimenting and making and the area of connecting and exchanging can be put together in the same process (Gauntlett, 2018). To make the connecting happen the participants could among other things establish workshops together, where the practical work and the celebration of creativity can take place. It is not limited to happen in either a physically based space or a digital and can actually contain both elements. It could take place in a common online world like Minecraft, where one can build in principle anything together. As part of the communication one activity could be to build something similar in LEGO or other materials on the floor locally, take pictures of it and upload it to a common drive. Another element in a media ecology would be to follow youtubers, who talk about and demonstrate how they use Minecraft. The combination of digital and physical spaces can also take place in two physically based workshops, that are connected through synchronous communication like Zoom or asynchronous through uploading and commenting images and video on the common drive.

The following set up is a suggestion that combines synchronous and asynchronous communication. The teacher and the participants can each of them have two screens available: the screen on the laptop and an external screen connected to the laptop. The external screen can be for webpages used for an activity or looking at an image while discussing. The link to the webpage or document can be shared in the chat function on f. ex. Zoom. Like that everybody can still see each other's faces without using the share-screen function that in itself is reducing the possibility to notice the reactions of each other when talking. The teacher can show power points on an external screen and just tell the students when to go to the next slide.

The description above can used as a tool for doing lectures, having discussions and still maintaining contact in a situation, where the communication is mediated through two screens. Teaching that might go on in a physical and ordinary classroom are adapted to a new format. But the use of zoom, screen and different kind of devices can also be used in other ways. One can also connect worktables and demonstrate tools, materials, objects and processes using a webcam. This webcam can be placed in a tripod next to the laptop and point the lens downwards towards the worktable. In that way the teacher can use her hands demonstrating objects, materials and processes. At the same time the teacher can have the camera on her laptop filming her face while she or he is talking and working on the objects and materials. The communication is based both on face and hand and the actual process between the participants. This particular set-up is best for minor objects and for smaller groups, because otherwise it is difficult to follow what is going on.

The webcam can obviously also be moved, but the mobile or tablet can easily be moved more freely and even around in different physical spaces, because it does not need to be connected to the laptop through a cable. So if one replaces the web cam with a mobile, one can get closer to both objects or just to turn it towards the person speaking. It is not only small objects, that one can use as a part of the process. It is also bigger objects or the body itself. The desk with the laptop does not only become a worktable, but the whole workspace becomes available. Obviously, it is possible to leave the laptop, the desk and the workspace all together and use other spaces as part of the workshop. This can happen through the mobile or the tablet. Especially the mobile seems to be a good tool to follow and investigate an on-going process more closely as you can place it rather close to what is being build or investigated.

The process between partners locally, regionally and globally can also be supported by other tools, where one can communicate in a near-synchronous way. One can record videos from the work process and edit them. The recorded video clip or the edited image uploaded on a chat forum can become part of a generative process, where people at one place can be inspired or challenged by what people at another place is doing. Somebody sees one image, respond to it and upload their own. The camera can become the access point between a vaste, global and developing network and the local workshop in a concrete space with concrete tools and materials. A tool like Currents is a way to support the communication between workshops. Currents is similar to a Facebook-group, but

it is easier to use this tool to get an overview and comment each other with both images and text. There are several columns available at the same time, where one can upload a post and there is also a menu, where one can choose who to follow more closely. In this construction one can upload and comment almost synchronously, but one can also wait and comment asynchronously over time. One workshop does not have to respond immediately to what another workshop does, but the possibility exists. The flexible meeting place with a number of workshops can actually consist of Zoom and Currents for exchange and a common drive for storage.

Transformation in networks

The set-up mentioned above is suited for a common creative process, where one gets inspired be others and start having a common discussion through images and text and reflections upon these expressions (Velicu, Thestrup & Giannis, 2019). A lot depends on how the exchange between the partners in a flexible meeting place or between several meeting places is understood. Does one need to copy what the others are doing or is it possible to see the exchange as a transformation process in a network? One way of staging the processes of transformation is f. ex. to give a task like this: Upload an image or video clip on Currents and comment why you put it up there. The next to comment uploads an image, that is a response to the first image, but not a copy. One can change everything from form to content and write about why and how. Then the next can add again images and written comments reflecting upon own and others work - and so forth. This use of Currents is a good way of opening up for many different ideas, inspiration and discussions about communication, form and content. But it also seems a bit difficult to focus on one subject or area, when that might be needed.

To deal with problem mentioned above, the overall process can be organized like this: First a zoom meeting where the framework for the future experiments are established and demonstrated. The use of webcameras and mobiles is an option and can investigated here. This can be supplemented with videos on the use of materials and tools and other videos on intentions and processes (Petrich et all, 2016). Then the participants can be asked to experiment in groups on form and expression. This can happen it two ways. Either uploading on a common drive, so others can see what they are doing and be inspired or entering a tool like Currents, where the task can be to transform into new expressions, what others have done. Doing the latter, one can still also upload to a drive to use the files here as sources of material. Then the participants in groups can choose to work more closely with what they have become interested in and show this to the other groups. Finally a new zoom meeting, where the teacher and the students discuss, reflect and decide what to do next. After the zoom meeting the experimenting process continues and can become more focused in a chosen area of special and common interest.

The intention is also to meet the challenge that all the participants in a network do not have the same access to digital media or digital technologies. The same goes for other resources, that might be unevenly distributed. Instead of establishing a hierarchy where some do it better because of their technology one might try to establish a collaboration where one´s abilities are valued equally important. To have less possibilities is not the same as being less able to inspire someone else in the world. If the local tools, materials and processes are used, because they are important to a group of people for cultural and social reasons, then this group of people are equal in the open laboratory to the other participants in the laboratory. This also means that when people meet in emerging networks, then they both can present, what they find important to do and the same time try to understand, what others bring to the table in the laboratory. This is not a static situation, but a process of possible change. The experimenting community in a network might change their mind, get curious and get ready to adapt elements in their own culture and also establish processes, that can lead to common processes, expressions and elements of a common culture. In principle a flexible meeting place based on transformation is open to new technologies, new expressions and new common challenges. The flexible meeting place is flexible to letting networks grow and change depending on the actual participants in them. The flexible meeting places and the workshops in them can establish emerging processes in networks and add to learning processes and global awareness across time and space.

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Bibliography

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Using data mining to understand how technology is expressed in curriculums to mediate learning outcomes

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Abstract

The role of technology in education increases with the increasing need for students to master technology in their practice. However, mastering technology in modern practice has become increasingly complex and requires a deeper understanding of the technologies—technologies hold premises in terms of how they limit and enable actions. While correct use can improve practice, wrong use can harm and lay waste to resources and job satisfaction. Ensuring that students can manage this complexity requires that technology is actively reflected in realistic settings. However, how do the curriculums that steer education reflect the role of technology, and do the curriculums steer the learning of technology in an advantageous direction? In this study we investigate curriculums across educations to explore how technology is expressed. This exploration will be used to discuss the role of technology in education, how it is expressed in curriculums documents, and its potential advantages and problems. The exploration is done using text mining to identify and extract specific features of the natural language of the curriculums. The features extracted will be used to highlight specific patterns related to the use of technology in education. The contribution of this paper is twofold. Firstly, it provides a method for data mining to identify patterns of technological use in education, manifested in curriculums. Secondly, it shows how technology is viewed in education.

Keywords

data mining, learning outcome, SOLO taxonomy, technology in education, curriculum

Introduction

The presence of technology is becoming more relevant with the advent of increasing efficiency and understanding in professional practice. Architects need to extend how they design their buildings, and nurses want to mediate better treatment. A professional practitioner must master technology and understand how to reflect and use technology (Schön, 1983). In education, we need to accommodate technology so that future practitioners can mediate their practice and include the educational considerations of using technology described by learning outcomes in the curriculums.

Technology has many roles in connection to education and teaching. First of all, educational technologies are used as a medium for communication. The building block for these technologies is language. In this sense, language itself is a technology supported by artifacts like blackboards, computers, pens, and paper used in the classroom. These technologies are combined with more process-oriented technologies like the teaching methods applied by the teacher. Each technology facilitates the process of learning by enabling communication between students and teachers. Technology can also be the object or the theme in teaching and learning. Students can learn about the technologies they are surrounded by and learn about the technologies a profession uses. We use technologies all the time, and often we need to learn how to make use of and understand them. As an example, not only do students use social media, but they need to know how social media works. Moreover, not everyone will be a cook, auto mechanic, or computer scientist, but students still need to learn about the technologies used in their everyday lives. In some cases, students need to learn specific technologies. If they are students in a particular discipline, they need to know about the technologies used by that profession. These are the technologies that we will focus on in this article.

Technology in education

The role of technology in society is becoming increasingly important as a solution to many societal challenges. Technology is both a tremendous societal benefit and, in many cases, introduces unforeseen challenges and problems that need to be accommodated. Technology does not determine innovation but relies on human agents to explore its use through play and experimentation with associated perceptions of its possibilities. Therefore, technology not only constitutes the tools that humans use to solve problems but can be viewed as cultural artifacts that embed values, intentions, and world views that implicitly contain particular rationalities (the way artifacts are designed to work) that our society needs to comprehend in order to use the technology properly (Hasse and Storgaard Brok, 2015).

In education, students need to understand technology as cultural artifacts and interpret it in their situated practice for its purpose. For example, Danish students in building design often use technologies developed in a North American context. Therefore, to use the technology properly, the students need to understand the cultural influence under which the technology was developed and re-interpret the technology for the students' situated professional practice in Denmark. Technology as a cultural artifact contains values in respect of what a building design should contain and how it should be presented that might not suit the Danish building design culture, and therefore needs to be adapted. The educators should be aware of such cultural aspects and facilitate such understanding and adaption to integrate the technology properly in the learning environment.

Wartofsky (1979) was a proponent of looking at artifacts as cultural tools representing the artifacts themselves and cultural meaning across contexts. Wartofsky differentiated between three different categories of artifact, expressing their ability to mediate cultural history and meaning. Primary artifacts are items such as axes, pens, or cars. Secondary artifacts would be manuals for driving a car, proper use of axes, or reusing pens. Tertiary artifacts are often considered works of art that "constitute a 'world' (or 'worlds') of imaginative praxis" (Wartofsky, 1979, p. 207). In other words, tertiary artifacts allow human imagination to mediate their actions in domains other than the artifact's intended.

This view resembles how the later learning theory of observed learning outcomes (SOLO) taxonomy views the highest level of learning, extended abstract, in which the student can extend their knowledge about a field to new domains. Examples of these tertiary artifacts have been differentiated between where-from and where-to. The where-from consists of an amalgam of historical contexts of the artifacts used—for example, the reasons why electrical panels look like they do. Where-to are visions-of-the-future artifacts, where a piece of artwork is used to convey a vision of an organization’s future ambitions, like a car designer company that wants to direct its car designs toward resemblance of a jaguar, both physically and culturally (embedding speed, power, and exoticism).

These different levels signify the potential affordances that technological artifacts contain. Affordance is the latent potential of technology to mediate human action. When teachers' and students' bodies and minds are intertwined, their use of technology fulfills its promise. Yet, this promise is restricted by the teachers’ and students’ user experience, which, when lacking, restricts students’ ability to imagine the technology's use. It is therefore essential to let the students learn from teachers and mentors with experience of using the technology and to install more features that allow the students to extend the technology's use beyond what was intended. With technology, new affordances appear, especially regarding ICT. There is a need to promote learning about meta-knowledge—i.e., where to find and valuate knowledge—which will support students' ability to solve problems in an ever-changing world (Somekh, 2007).

Technology in curriculums and relationship with learning outcomes

The role of technology in education is manifested in the main steering document for education, the curriculum. Curriculums are official documents agreed upon and used across institutions in Denmark. It is here that educators interpret the role of technology according to the learning outcomes defined and give direction to the teachers work and secure an aligned learning environment. Accommodation of the learning outcomes for the technology must be aligned with the other learning outcomes and the concrete context of the students; it is therefore subject to the individual teacher's interpretation. These interpretations are then based on the teacher's own perceptions and ideas about teaching and the technologies introduced to the students.

Curriculums are fundamental to educational programs in terms of manifesting the learning outcomes and helping teachers guide the education of the students. Curriculums must express the objectives for each learning activity and the evaluation of these activities. Typically, curriculums are expressed by high-level and abstract verbs that

signal students' knowledge, skills, and competencies. Teaching and learning can be perceived as a whole system connected from the concrete classroom to the department and institutional levels of the organization. It has been argued that a discrepancy between the learning outcomes and what is actually done at the different levels constitutes a poor learning and teaching system. Biggs et al. (2013) argued that to ensure an aligned learning environment, there must be defined desired learning outcomes, related activities that lead to these outcomes, proper matching of what the students are learning, and a final grade.

Learning about and with technology will be an increasingly crucial aspect of education. How education frames the role of technology for students impacts how they can act with technology in their future professions. This article will explore how learning outcomes concerning technology in education are manifested as cultural artifacts in curriculums to identify specific patterns in relation to the SOLO taxonomy. Identifying these patterns will highlight the relationship between technology, education, and the learning outcomes described in curriculums.

Methodology

In order to explore the connection between technology and learning outcomes in curriculums, we base this investigation on a concrete case. The case used is the University College of Northern Denmark (UCN), an educational institution with 35 educational programs based on two educational levels: academic professional (AP) and Bachelor's degree.

Data mining

Data mining is an umbrella concept that refers to various techniques used to analyze large quantities of data. This can be done analogically, but today, it is often done digitally. Analyzing a large quantity of data is about identifying and exploring interesting patterns. Data mining is often used to analyze documents containing rich semantic and syntactic structures in explicit and implicit content from which patterns can emerge. It requires an understanding of the natural language and the structure of the documents—for example, how natural language expresses the pedagogical applications of technology in the curriculum.

The method can broadly be divided into pre-processing, core mining operations, and presentation (Feldman and Sanger, 2006). Throughout the analysis, we used the programming language R and related packages. Firstly, documents had to be collected and cleaned. This is a part of the pre-processing. Two aspects of data mining are considered critical: scrubbing and normalizing data. Scrubbing data and normalizing the data comprise a process of transforming unstructured data that need to be removed or fixed for the patterns to emerge. We configured a web crawler (Rcrawler) to search the UCN website for PDF files from the different educational programs to collect all the curriculum documents. In scraping the website for curriculum documents, we inspected some of the HTML pages for the structure of these pages. All links to the curriculum documents appeared in reverse chronological order, meaning that the newest revisions were at the top. Most educational programs had two curriculum documents, one for national and one for institutional regulations. We therefore decided to pick the top two documents from every page, except for pages with only one link.

The text from the PDF files was extracted using the package pdftools. A common challenge in these documents is that there are many headers and lists where punctuation is occasionally omitted. It thereby becomes unclear when a sentence ends, and often what is considered a sentence does not convey meaning in itself. In a couple of cases, the document's text was rendered as images, so we had to undertake optical character recognition (OCR) to extract the text using Tesseract. Finally, basic metadata were collected about the relationships between the documents and the educational programs. As part of the pre-processing, the extracted text was cleaned by removing sentences shorter than four words, converting all characters to lower case, removing punctuation, annotating, and stemming words. This process gave us a collection of structured data and metadata for the analysis.

The core mining operations are the techniques involved in doing the analysis itself. Two main techniques are in use. One is finding the frequency of the term ‘technology’ in the texts. The other is finding the relationship between the educational program and the taxonomical level across sentences where the term ‘technology’ is present.

Using SOLO taxonomy to identify verbs and their relationship with technology

The SOLO taxonomy can help classify learning outcomes regarding complexity and quality. The SOLO taxonomy rates student activities in five categories, from pre-structural, to uni-structural, multi-structural, rational, and extended abstract, each specifying characteristics of students' understanding (Biggs and Tang, 2011). These

characteristics are expressed as verbs. In a uni-structural understanding of a field, the student can identify and name certain aspects of a knowledge domain and express certain procedures. For example, in the construction industry, one can identify and name materials and express simple procedures for using these materials. In the extended abstract, the student can generalize knowledge about, for example, building materials, apply that to different cases, and reflect upon potential challenges. See Figure 1.

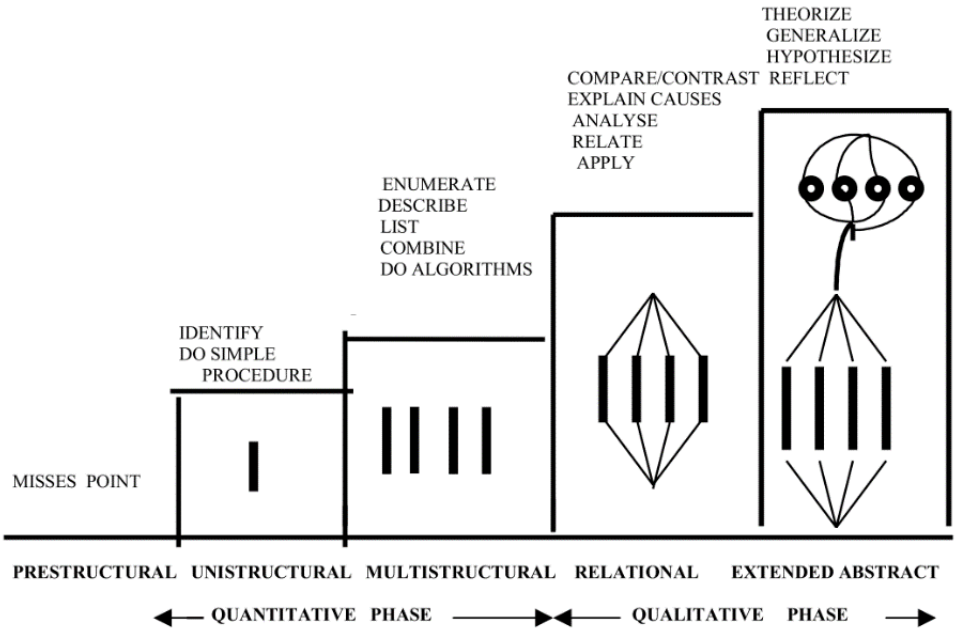

Figure 3. A hierarchy of verbs that may be used to form curriculum objectives (Biggs and Tang, 2011, p. 91)

Regarding the case of UCN, learning outcomes are divided into three classes according to the taxonomic level in the curriculums. These classes are knowledge, skills, and competencies. For each element/module/course in a program, the learning outcomes are structured according to these classes. We have not attempted to capture this structure in the following analysis because different documents have different layouts. Therefore, we treat every sentence in the document as an independent unit. For each unit (sentence), we identify the term 'technology' in connection to the verbs used. Using the SOLO taxonomy, we then identify verbs in curriculums that signify different levels of competence. These levels can be used to signify how learning outcomes are expressed in curriculums.

In the last phase of the data mining process, we present data in three different ways. The frequency of the term 'technology' can tell us where the term is most often used. We display the frequency of the term across sentences in a graph for each educational program. Secondly, we summarize verbs in connection to the term 'technology', first by their frequency and then by their relationship to the SOLO taxonomy. We display this in tables. Finally, using the package igraph, we display the relationship between the two concepts—the educational program and the SOLO taxonomy—in a graph. This graph is based on the relationships between the verbs that are categorized using the SOLO taxonomy and the term 'technology'. After presenting the data, we use selected excerpts from the texts to exemplify our findings.

Results

In this section we present how the learning outcomes in relation to technology in the curriculums of the educational programs are manifested as cultural artefacts. For this purpose, we use UCN's curriculums with our above presented method. Using the SOLO taxonomy and data mining allows us to identify specific patterns that can highlight the relationship between the role of technology and education. These results are presented in two sub-sections, the first, how often the term 'technology' occurs in each of the curriculums, and secondly, the relationship between the verbs related to the SOLO taxonomy and the term 'technology'.

Occurrences of the term ‘technology’

The most basic analysis is the collection and summarization of all the relevant sentences in the documents. Here, we are looking for sentences that contain the term ‘technology’. In Danish, words are often compound words, which means that the word ‘technology’ can appear in combination with other words. The term ‘web technology’ is an example: in Danish, this would be ‘webteknologi’. These words are also included in the analysis.

We calculated what percentage of the sentences contained the word ‘technology’ for each curriculum. As shown in Figure 2, not surprisingly, some of the more technical programs are at the top: here we can list Product Development and Technical Integration, Multimedia Design, and IT Technology.

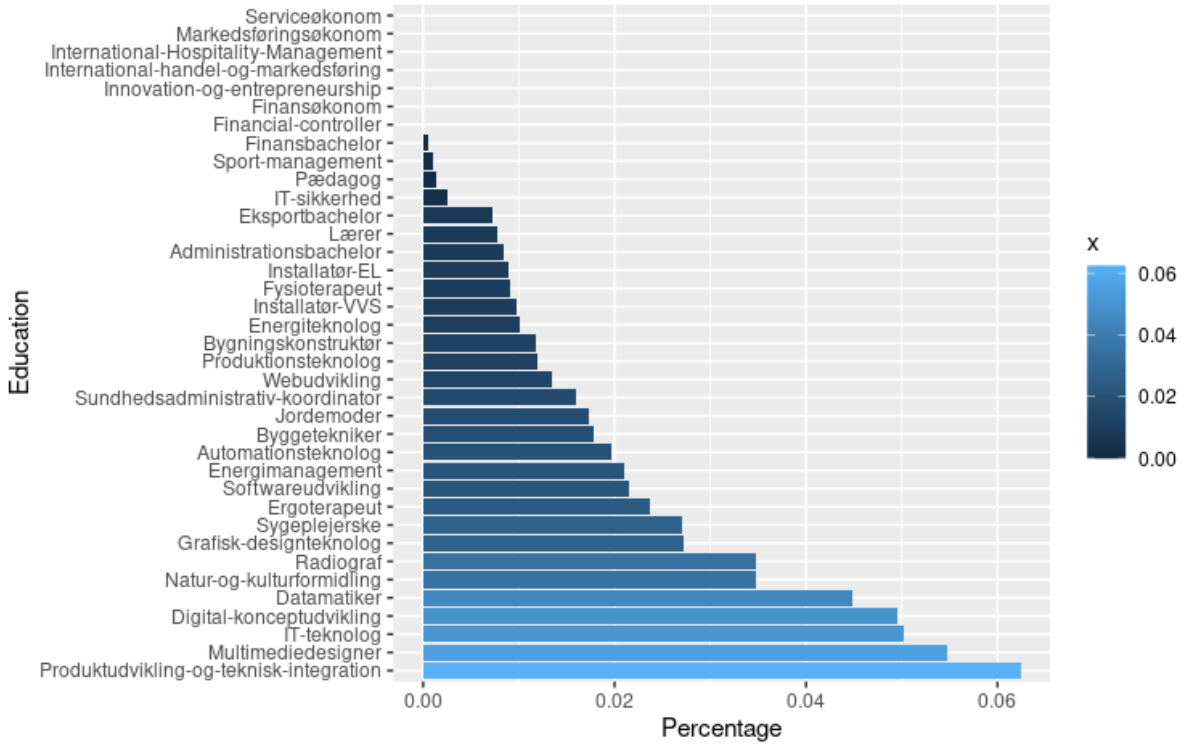

Figure 2. Frequency of the term ‘technology’ across 37 different curriculums

Looking more closely at the curriculum for product development and technical integration, we find that students should have "knowledge of theory and practice within product development and technical integration, based on an understanding of technology that includes the elements technology, knowledge, organization and product." In the curriculum for multimedia design, we find something similar. One of the program elements is called “User interface design and technology”, and one of the learning outcomes for this element is that the students learn skills in "applying key technologies for exchanging and presenting complex data sets in digital user interfaces". These two are examples of how technology is expressed in the more of the technical programs. In the first example, students should have a specific understanding of technology that can inform their knowledge about theory and practice in the profession. In the second example, students should learn skills using technologies.

More surprisingly, some of the health-related educations also appear near the top in Figure 2. One is education in radiography, which is maybe not that surprising in that it involves using a lot of equipment. The following is an example of one of the learning outcomes: "... apply, justify, and evaluate radiographic techniques and methods in the choice of modality in connection with the planning, implementation, and evaluation of MRI, X-ray, and CT examinations and assessing the possibilities and limitations concerning optimal use of the technologies." This is a lot to take in, but basically, students should apply, justify and evaluate technologies used in radiography. Another health-related education is nursing education. A learning outcome for the students in nursing education is that they should be able to "apply and reflect on technologies in the application and development of care, nursing, and treatment." For both health-related programs, not only does technology have a function within the profession, but the students should learn to reflect upon and evaluate the use of technologies.

The relationship between the verbs related to the SOLO taxonomy and the term technology

The results of the data mining showed that 71 verbs associated with the term ‘technology’ were identified across all the curriculums. As shown in Table 1, the most relevant was the verb use (Biggs and Tang, 2011).

Verb stem (Danish)	Verb (English)	SOLO level	Number of references
anv	use	3	51
reflek	reflect	4	35
vurd	access	3	21
forstå	understand	1	14
påtag	undertake	3	13
anvend	use	3	11
arbejd	work	3	11
begrund	reason	3	9
hånd	handle	3	8
kombin	combine	4	8
analys	analyze	3	7
inddrag	include	1	7
indgå	be part of	3	7
udvikl	develop	3	7
beskriv	describe	1	5

Table 1. List of top 15 verbs

Each verb was manually categorized based on the SOLO taxonomy. This procedure, of course, relied on our judgment and was challenging to apply because not all learning outcomes are expressed as intended learning outcomes (ILO) (Biggs et al., 2013). The second column in Table 1 represents all the verbs translated to English. The mapping of the verb to the SOLO taxonomy is found in the third column and the frequency in the fourth column.

Level	Title	Number of references
0	Pre-structural	0
1	Uni-structural	4
2	Multi-structural	6
3	Relational	48
4	Extended abstract	13

Table 2. The relationship between verbs and technology following the SOLO taxonomy’s levels

In Table 2, the data indicate that the taxonomy level referred to most is the relational level. The first level, the level named uni-structural, is not referred to that often. There could be several reasons for this. One reason could be that the general term ‘technology’ is not mentioned under the subsections concerning knowledge of the taxonomical class. One of the features of SOLO is that knowledge underlies all levels, but in general, verbs like ‘memorize’, ‘identify’, or ‘recite’ are too basic when it comes to the formulations used in the learning outcomes. As mentioned above, we cannot know this because sentences are independent units in the analysis. Another reason could be that technology is always connected to a verb in one of the other levels when mentioned. For example, objectives do not state that students should know specific facts, but instead that they should be able to access something or justify choices, which implies that they should also know something about the subject area. An example could be nursing education, where one of the learning outcomes under the subsection ‘Knowledge’ states: "[The student can] reflect on the profession's use of technology in care, treatment, and quality assurance." In our analysis, this sentence will count as an observation with a connection between ‘reflect’ and ‘technology’. So, firstly, the sentence will count

in the extended abstract level. Secondly, it is difficult to pinpoint precisely what knowledge the student should have in this case, but students should probably know something about the technology in this context in order to reflect.

Figure 3. The relationship between educational programs and the SOLO taxonomic levels

Figure 3 illustrates the relationship between educational programs (or the curriculums) and the levels in the SOLO taxonomy. Two different academic degrees are represented in the figure. The green represents academy profession (AP) degrees and the blue represents Bachelor's degree programs. The weight of the edge (the lines) is an expression of the number of observations. The larger the weight, the closer the education and the level vertexes are. Across all curriculums, there are 315 observations. One edge in Figure 3 is an aggregation of one or more observations where the verb and the term ‘technology’ are found in the same sentence. It is important to stress that Figure 3 is not a general expression of how the different curriculums use verbs or taxonomies in learning outcomes. The data collected are only concerned with those sentences that carry the term ‘technology’.

Interestingly, levels 2, 3, and 4 are the levels that have the most relationships, even though Table 2 shows that level 3 is the most prominent. This is because a lot of the relationships to level 3 are aggregated into one, and at the same time, more educational programs refer to levels 2 and 4, but not that often. This shows us that the relational level is dominant, but equally that the learning outcomes that include the term ‘technology’ address the multi structural and extended abstract levels. An example of a learning outcome on the relational level is the syllabus in web development: "[Students can] implement a solution with the chosen technologies." The students

should be able to apply what they have learned using technologies. At the same time, they should be capable of choosing between different technologies, which suggests that this objective also requires the students to analyze the relationship between the technologies and the relationship between the technologies and the context.

An example from the occupational therapy curriculum is: "The student can discuss and analyze technology and the therapeutic potential of the technology". Not only should the students have knowledge about and skills in using technology: it is also essential that they can discuss and analyze how technology is part of their profession. Even though this learning outcome seems to be on a higher level than the example from the web development curriculum, in terms of the SOLO taxonomy, we are still on the relational level. Another example is from the occupational therapy curriculum: "The student can reflect on the profession's use of information and communication technology". Not only should the students be capable of discussing and analyzing the use of technology, but they should also be able to reflect on the use of technology in the profession. In the context of the SOLO taxonomy, this objective fits into the extended abstract level.

The weight of the edges in Figure 3 suggests that some of the educational programs show a more frequent relationship between our list of verbs and the term ‘technology’. As the only AP degree, multimedia design is placed close to and between the relational and extended abstract levels in Figure 3. A closer look at the curriculum reveals that we have a total of 30 references. Students should, of course, be able to select and use technologies—skills that we have placed on the relational level. On the extended abstract level, we have placed verbs like ‘designing’, ‘programming’, and ‘combining’, which are crucial skills for a multimedia designer. This is similar to programs that focus on reflection in relation to technology, like the occupational therapy program mentioned above.

An example of a program that directs the attention more to the cultural use of technology is the Bachelor’s degree in Natural and Cultural Heritage Management. The program is in the upper quadrant in Figure 3, with frequent usage of the term ‘technology’ in the curriculum. This is interesting in itself. The students' skills in using technology and digital technology are essential, as shown in this example from one of the main subjects in entrepreneurship: "The student can use and justify the choice of digital technology in a practical context." The use of technology in relation to the educational programs in the field of the experience industry/economy shows another side of technology in addition to the more technical educational programs where the focus is more on development.

Discussion and Conclusion

Using the theories of Wartofsky (1979) on technology as culturally mediating artifacts, learning outcomes, and the SOLO taxonomy (Biggs and Tang, 2011), we enabled a structured exploration of the curriculums using the data mining methodology (Feldman and Sanger, 2006). Using this methodological framework, we were able to discover interesting patterns in how different educational programs have interpreted the role of technology. The analysis resulted in various competencies concerning technology's role in education based on the level and type of education.

Differences between the role of technology in the educational programs

Our results show that different educational programs relate the term ‘technology’ to various verbs in reference to the skills and competencies related to technology spread over both the academic level and subject area. Generally speaking, the use of the term ‘technology’ falls into three categories: understanding technology, using or applying technology, and reflecting on the use of technology in the context of the profession.

A pattern in our results shows that, in relation to the SOLO taxonomy, educational programs that heavily rely on technology as a part of the profession do not refer to technology as an abstract phenomenon in their curriculums. Here, the technology is embedded in the profession and therefore taken as given. For example, the curriculum for theBachelor's in architectural technology and construction management only has relations between ‘technology’ and the taxonomical level 1 and level 3. This shows that there are no learning outcomes in the curriculum to reach the extended abstract level where competencies are used to generalize or reflect—i.e., the profession does not deal with the abstract notion of technologies per se, but instead with concrete tools like building information modeling (BIM) or digital simulation of statics. Students are thereby encouraged to use concrete tools like BIM to solve concrete problems. Here, the technology does not act beyond its primary aim (primary artifact) and its use is not encouraged outside specific cases specified in the curriculum. This shows a dichotomy between the overall objective that students should learn to reflect on technology and what the curriculum expresses, a dichotomy that

can lead to misalignment and restrict students' ability to act with technology in their educational or specific application context.

In contrast, health-based education in professions like nursing, midwifery, and occupational therapy is very high in the SOLO taxonomy and is very explicit when expressing the connection between the profession and the use of technology. While one would not typically consider these educational programs to be technology-centric, the curriculums reflect learning outcomes that strive to contend with technology in the profession more abstractly, as seen in the results section. This shows how students are encouraged to, for example, analyze using technology, and thus signals a tertiary approach to the technological artifacts. Here, reflecting with the use of technology implies an in-depth understanding of the technology's culture in the education. The history of the technology how was it devised, who helped develop it, and how it can be used form the foundations of analyzing technology within the profession. Tertiary artifacts define students' professional direction to enable reflection and allow them to imagine alternative activities using the technology (Engestrom, 2007).

Differences between educational levels and the SOLO taxonomy

In Table 2, it is apparent that level 3 (relational) is the most commonly mentioned, with two-thirds of all the references. This fits well with the overall Framework for Qualifications (the Danish version distinguishes between AP and Bachelor's degrees). Here we refer to one of the bullets: in the AP degree, students should understand and use theory and methods in their praxis, whereas students should understand and reflect on theory, methods, and praxis in the Bachelor's degree (Uddannelses-og Forskningsministeriet, 2008). In both degrees, students should, of course, use and understand theory and methods, which could be the reason for the many references to level 3. However, even though there is a clear distinction between the two educational degrees, it is not clear from Figure 3 that level 4 in the SOLO taxonomy, in theory, should relate more to the Bachelor's programs. The relationships between AP degree programs (green vertexes) and the level vertexes are similar to the relations between Bachelor's degree programs (blue vertexes) and the level vertexes. On the one hand, this is surprising. However, the nuance between the two educational degrees in the Framework for Qualifications can be hard to follow. Therefore, it can be hard to formulate the often-abstract learning outcome in the curriculum.

Limitations of using data mining to explore the role of learning outcomes in curriculums

We only searched for the term 'technology' in our analysis, and there could be many synonyms for the term that we overlooked. We search for an abstract concept where the curriculums maybe use more concrete terms. An example from the education of financial controllers could be: "... use methods and tools in financial management systems and processes." Here, it states that students should be able to use 'tools' within the context of the profession. Tools, systems, and processes are all considered forms of technology. Often, sentences are constructed in a way that makes it unclear which verbs are related to the term 'technology'. We picked sentences (or fragments of sentences) where the verb preceded the term 'technology', but the appropriate verb might be placed later in the sentence. In these situations, the relationship between the verb and the term is missing in the analysis. An example of a sentence from the educational program for digital concept development is: "... understanding the interplay between human, business, society and digital technology based on relevant theories, methods, and analyses." In our analysis, this ended up as a relationship between 'understand' and 'technology'. However, at the end of the sentence, we can see that the understanding should be based on analysis. So, this learning outcome would require the students not only to understand the technology but to analyze it.

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Open is not enough: design considerations for a networked data commons

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Abstract

Recently, researchers within the Networked Learning (NL) community have tried to (re)claim NL's roots in critical pedagogy and (re)assert its commitment to social justice (Networked Learning Editorial Collective, 2021; 2021a). However, despite these avowed intentions, NL has also been criticised from within for "fail[ing] to take account of emancipatory struggles and political imperatives in society more broadly" (Networked Learning Editorial Collective, 2021a, p. 328). The suggestion is made to put NL "to work … to allow the concept of NL itself to become 'networked': to make connections, to interrelate, to transform, mutate, and hybridise in response to the pressing issues of our time" (Networked Learning Editorial Collective, 2021a, p. 359). In this paper, we take concepts from NL and put them "to work" in relation to the design of an informal digital learning environment – that is, a digital environment that lies outside of formal education provision, but that is intended to be a place where knowledge can be shared and circulated and where people encounter knowledge in ways that enable them to think, understand or act differently. The work was carried out in the context of a project aiming to develop design principles for an internet-based platform through people would be able to openly access, learn about and share publicly available data, using Scotland's waste and re-use data as a case study. In this context, we plug NL into a theoretical and methodological design assemblage that connects concepts of openness, data literacy, (de)coloniality, and participatory design into new formations that we hope will allow these concepts to mutate and hybridise into something closer to the social justice ideals that NL claims.

Keywords

Open data, commons, network, decoloniality, phenomenography, values, co-design.

Introduction

Recently, researchers within the Networked Learning (NL) community have tried to (re)claim NL's roots in critical pedagogy and (re)assert its commitment to social justice (Networked Learning Editorial Collective, 2021; 2021a). However, despite these avowed intentions, NL has also been criticised from within for "fail[ing] to take account of emancipatory struggles and political imperatives in society more broadly" (Networked Learning Editorial Collective, 2021a, p. 328). A tendency to fixate on collaboration, co-operation and collective inquiry, trusting relationships, shared challenge and so-called "convivial technologies" (Networked Learning Editorial Collective, 2021) risks "a collapse into pure process, a fetishization of interaction for its own sake, even a new version of what

Biesta (2012) calls 'learnification' (Networked Learning Editorial Collective, 2021a, p. 328). The suggestion is made to put NL "to work … to allow the concept of NL itself to become 'networked': to make connections, to interrelate, to transform, mutate, and hybridise in response to the pressing issues of our time" (Networked Learning Editorial Collective, 2021a, p. 359).

This paper emerges out of work the authors have engaged in as part of the Data Commons Scotland project. In it, we take concepts from NL and put them "to work" in relation to the design of an informal digital learning environment – that is, a digital environment that lies outside of formal education provision, but that is intended to be a place where knowledge can be shared and circulated and where people encounter knowledge in ways that enable them to think, understand or act differently. We plug NL into a theoretical and methodological design assemblage that connects concepts of openness, data literacy, (de)coloniality, and participatory design into new formations that we hope will allow these concepts to mutate and hybridise into something closer to the social justice ideals that NL claims.

First, we explore some issues relating to Open Data and the Open Data movement. We then draw on concepts from the recent decolonial turn in critical digital studies and the related field of human-computer interaction (HCI) research and design. We show that aspects of the coloniality that has been identified as underpinning corporate Big Data and technical design practices are also present in and reproduced by Open Data narratives and practices. In order to resolve some of these implicit colonising (and sometimes paternalistic) tendencies, we need to go beyond the simple and singular notion of *open* data to develop more nuanced, context-dependent conceptions of multiple sociotechnical data-human assemblages. We mobilise De Angelis's (2017) description of a commons as an (eco)system comprised of common goods, commoners and social relationships as a way of conceptualising these assemblages, and suggest ways in which core concepts from NL can be adopted and adapted in thinking about their design. We then apply these ideas in relation to the design of a networked data commons intended to serve the particular purpose of increasing the circulation, production and valorisation of data relating to waste management (including recycling and diversion through reuse) within Scotland.

Open data, data (de)colonialism and a networked data commons

While people may be generators of data, the majority are excluded from the production and evolution of both digital technologies and data sets or collections, with control of these processes predominantly lying in the hands of large corporations and governments. For many, relationships with data in particular are characterised by an imbalance of power, and the ubiquitous generation and use of data may seem a threat to agency and empowerment rather than an opportunity. Efforts have been made to counter this through both the Open Data movement (see, e.g., Davies et al., 2019) and participatory and co-design movements (see, e.g., Simonsen and Robertson, 2013); however, more recently, critical digital studies have begun to undergo a "decolonial turn" (Alvarado Garcia et al., 2021; Couldry and Mejias, 2021; Cruz, 2021), which attempts to articulate and resist the re-productive tendencies of existing data and HCI practices.

Open Data and its discontents

The Open Data movement has long sought to make data more accessible in order to foster economic and social well-being (Shirky, 2010), as well as business innovation and productivity (Jenkins et al., 2013). Open Knowledge International links data and knowledge through their definition of Open Data: "Knowledge is open if anyone is free to access, use, modify, and share it – subject, at most, to measures that preserve provenance and openness" (Open Knowledge Foundation, n.d.). Open Data advocates assert that making data openly available will create new opportunities for economic activity, improve transparency and governance, and empower people to live in more creative and sustainable ways through increased knowledge. Within this perspective, data are described as:

> a public good that enables the creation of a wide range of products and services. All sectors of our economies, at the local, national, and global level, rely on it. Roads help us to navigate to a destination; data helps us to navigate to a decision. (Dodds and Wells, 2019, p. 260)

Partly as a result of the efforts of the Open Data movement has been at least partially responsible for local, national and international agreements that commit governments and organisations to publishing data openly, such as the Helsinki Region Infoshare (Helsinki Region Infoshare, 2011), the Scottish Government Open Data Strategy (Scottish Government, 2015) and the G8 Open Data Charter (G8, 2016). As a result, large quantities of data are now being produced by many organisations and published openly online. Yet despite several years of effort, the extent to which these data are genuinely open to critical and creative interaction remains limited. It has been

suggested for some years now that it is too simplistic to assume open publication of data will automatically lead to increased and democratised data use (Janssen et al. 2012). Data may be hard to find, use or trust (Meijer et al., 2012), leading to what has been described as the myth of public reuse of government data (Hellberg & Hedström, 2015). Even strong supporters of the Open Data movement recognise that there are problems: "at the moment, too much of our data infrastructure is unreliable, inaccessible, siloed, or can only be used if you can afford access" (Dodds and Wells, 2019, p. 261). As a result, "[d]ata innovators struggle to get hold of data and to work out how they can best use it, while individuals do not feel that they are in control of how data about them is used or shared" (ibid.).

More fundamental critiques have also been levelled at both the practical enactment of openness and the movement's political and philosophical underpinnings. Kitchin (2013) outlined four critiques of Open Data, including two at the level of practical enactment, in relation to funding and sustainability, utility and usability; and two at the level of politics and philosophy, in relation to "the politics of the benign and empowering the empowered" (n.p.) and an inherent neoliberalisation and marketisation of public services. We can connect these critiques to some of the issues identified above; funding and sustainability may be part of the reason for infrastructure unreliability, utility and usability clearly depend on access, the reference to "data innovators" suggests Kitchin's empowering of the empowered, and the discourse of innovation links strongly to that of neoliberalism and marketisation. Perhaps because the Open Data movement has historically drawn on elements of both technological libertarianism and neo-Marxism, the concept of Open Data has a sometimes tense and ambivalent relationship with notions such as private ownership and the market. As Lund describes, there is:

> a central ideological lacuna in absent discussions of unconditionally opened-up resources that strengthen the accumulation cycle of capital. This logic favours the negative freedom of closed business models in the competition with open ones that could foster more positive notions of freedom, although open business models are generally advocated and commons are mentioned as desirable. In a dominant ideological formation, openness is used to promote its opposite in the economic field. (2017, n.p.)

It is concerns such as these that lead Lockley to ask if "openness tend[s] towards serving a hegemonic public while claiming to work for everyone?" (2018, p. 146) and to suggest that "open" has come to "[function] like 'green', 'fair trade' and 'free range' as both a marketing term and an exclusionary term" (ibid.). While perhaps better than nothing, openness, as it currently stands, seems to be no guarantee of a democratising, let alone emancipatory, capacity.

Digital and data (de)colonialism

Narratives and critiques of openness have circulated within critical digital studies for some years now, but it is only recently that the field has started to take a decolonial turn. This has begun with a recognition that data and digital technologies may enact new forms of coloniality in the form of data practices, and particularly Big Data practices. Critiques of coloniality have largely focused on proprietary data (what might be thought of as *closed* data) and the acquisitive and exploitative actions of corporations. In their recent work, Couldry and Mejias:

> insist on an explanatory model for Big Data practices in which colonial extractivism remains a real, not metaphorical, feature of capitalist accumulation … the extraction of value through data represents a new form of resource appropriation on a par with the landgrab (the seizure of land, resources and labor) that kicked off historical colonialism (Couldry and Mejias, 2021, p. 3)

Thus the trope of data as "the new oil" is instead replaced with data as the new Dark Continent. But digital coloniality does not just reside in data harvesting or extraction practices; it is also potentially present in the ethical-political agency of sociotechnical systems (Introna, 2014; Wilson and De Paoli, 2019; Winner, 1980). In the field of HCI, a recent manifesto aims to help HCI researchers and designers avoid coloniality, and to open up the discipline so that it can operate in a 'world of many worlds'. (Alvarado Garcia et al., 2021, p. 8). Stressing the importance of "land" (understood both literally and metaphorically), the authors of this manifesto recognise the complex ways in which designers of sociotechnical systems embody their own relationship with land and territory, which "shapes our way of making sense of and being in multiple world(s), as we are walking contradictions ... [and which] materializes itself in our everyday life experiences, expressing itself in ever-changing questions of belonging and identity" (p. 4). This leads to a further awareness of the complicity of designers in both extractivism and in the design of systems that perpetuate particular political and power relationships, and (exploitative) forms

of work, "unknowingly reproduce[ing] standards and processes that follow a capitalist logic (problem solving, evangelizing UX, designing for universalism, etc)" (p. 5). In a move that essentially asks HCI professionals to reflect on and critique assumptions about the 4W1H/5W1H design processes, the manifesto urges people working in the field to follow five pathways to decoloniality: Understanding The Why, Reconsidering The How, Changing The For Whom, Expanding The What and Reflecting on The What For (p. 4).

Cruz (2021) makes some similar points in relation to the Philosophy of Technology. Asserting that "Western Modernity keeps imposing itself through a triple mutually reinforcing and shaping imprisonment: coloniality of power, coloniality of knowledge, and coloniality of being" (p.1847), Cruz suggests that "technical design has an essential role in either maintaining or overcoming coloniality" (ibid.). He goes on to develop principles for both reflexivity and effective co-production with usually marginalised/subalternate communities. Cruz concludes that "[a]cknowledging and nurturing care (as labor/work, affect/affections, ethics/politics)" (p. 1862) should be sociotechnical design's first and non-negotiable principle.

Open data advocates: decolonisers or missionaries?

The decolonial turn in critical digital studies has, to date, tended to focus on the extraction of value from, and the disempowerment of peoples within, the Global South by companies that are largely based in the Global North (including the USA and China). However, it is not only people in the Global South whose data feed the mills of data-capitalism. Any people or communities who contribute to but are excluded from the control of these processes might thus be considered marginalised or subalternate – inferior in status and power to those who both control and profit from data. Thus this perspective might also be usefully applied to explore and perhaps address some of the problems associated with the openness enacted by the Open Data movement.

As already noted above, positive narratives of Open Data often include "data innovators" and other holders of specialist, expert knowledge who hold the keys to activating that value. As some of the advocates of Open Data suggest, "the success of open data efforts is heavily dependent on the existence of an ecosystem of actors focused on driving the use of data through all aspects of society" (Dodds and Wells, 2019, p282). Implicit in this is a belief that this "ecosystem of actors" knows what is best for society and has the right to "drive" whatever they believe this to be through society. There is no acknowledgement that a lack of enthusiasm for (and even resistance to) increased data uptake and use may be valid, or may be related to the ethical-political values embedded in and enacted by Open Data-based sociotechnical systems. Indeed, as Lockley points out, "in every form of openness we have seen a tendency to an apolitical, almost ignorant nature, and a tendency to production from the global North" (Lockley, 2018, p. 159).

Similarly, solutions to the problem of trust (both in data and in the use of data) that have been proposed from within the Open Data community assume an uncomplicated and uncontested set of ethical-political, as well as use and exchange, values. Although there is a welcome acknowledgement that increasing levels of trust requires that the "the whole data ecosystem … build ethical considerations into how data is collected, managed, and used in order to ensure equity around who can access and use data and how the benefits are distributed" (Dodds and Wells, 2019, p. 267), little attempt has been made to explore (let alone challenge) precisely whose ethical considerations (and therefore judgements about values and valorisations) might come in to play. Indeed, although there is some recognition that there is more than one type of value, this has tended to be limited to the duality of use and exchange values, rather than ethical, political, social, aesthetic or other types of value. There is also little recognition of the cultural, geographical, and contextual contingency of value judgements and valorisations.

Thus, while proponents of Open Data may oppose the hegemony of Big Data corporations and closed government data – in the decolonial perspective, the new colonial powers – they often do so by encouraging more widespread diffusion and uptake of values and practices that characterise these powers. Even those Open Data projects that explicitly seek to decentralise data practices, such as Tim Berners-Lee's Solid project[8] or projects using distributed ledgers to achieve networked consensus have an explicit aim of giving data ownership back to individuals. Such efforts are also often characterised by what Lockley (2017) called Founding Fathers, a tendency that further embeds a somewhat paternalistic benevolence that is not far from the perspective of the well-meaning, *improving* coloniser (we brought them the railways, after all). In either case, people are encouraged to become more data literate.– to be educated into the data practices that allow Big Data corporations etc. to grow in power and profit. They are encouraged to find ways to extract economic and political value out of the data that have (graciously)

[8] https://solidproject.org/about

been made available to them. That is, data literacy is framed within a broader Open Data advocacy discourse that embodies *libre* notions of choice in relation to the use and reuse of data; however, the conditions of that choosing are limiting and circumspect. People are encouraged to take corporations and governments on at their own game, rather than to play a different game altogether. Thus despite good intentions, some Open Data advocates might be compared to the missionaries of the recent Western colonial era, attempting to bring enlightenment to the ignorant and benighted, rather than learning about and from their perhaps different perspectives on the potential values of and relationships with data – that is, their own data cultures.

It has previously been argued that designs for sociotechnical systems could (and perhaps should) start by recognising a plurality of values (Wilson et al., 2018). A crucial element of *decolonial* sociotechnical design approaches would therefore surely be to recognise not only that the perspectives of the usually marginalised or subalternate matter and can be understood, but also that they are themselves plural. Approaches that avoid (or at least attempt to avoid) slipping into binaries of us-and-them, of majority-and-other, need to be developed.

A data commons as a learnable, networked assemblage

A more productive and less colonial approach to democratising data may thus need to start by recognising that value, of whatever kind, is an emergent property of human-data-practice assemblages held together by social/sociotechnical relationships that depend on a range of different kinds of value. Such assemblages can be compared to contemporary conceptions of *commons*, in which culturally and contextually contingent but critically important social relationships and values are central features.

De Angelis (2017) describes a commons as an assemblage of common goods, people and the relational values that connect them. In his view, the common goods that define and are cultivated within a commons have "a use value for a plurality" but that simultaneously a plurality must "[claim and sustain] the ownership" of those common goods (p. 31). Common ownership is claimed and sustained by

> the creation of relational values, that is, values that select the 'goods and bads' of social action while at the same time sustaining and (re)producing one another, social relations, social practice and the ecology in which social practice is embedded (De Angelis, 2017, p. 31)

A commons as a whole is then a social (or sociotechnical) system of commonly held resources and a community of subjects who "engage in communing" (p. 90), controlling the system so that the resources are sustained and the community is reproduced. Importantly, communing is defined as "doing in commons that has a direct relation to the needs, desires and aspirations of the commoners" (ibid.) and as "a social process embedded in particular values that defines a sharing culture in a given time and context, through which they reproduce resources and the community that comprises them" (p. 104). That is, the relational values that connect up the components of the commons assemblage are related to the different ethical-political values held by the commoners. It is important to note that these are *created* through the interactions between commoners and common goods within the commons, rather than pre-determined or externally imposed. In the context of a data commons, this allows for values and valorisations of data to emerge through interactions with data, rather than inhering in the data themselves.

The concept of commons offers a way of recognising both the critical importance of different values and valorisations of data, and their contingent, emergent nature. However we also wish to avoid the "romanticism of the commons" (Lockley, 2017, p. 155); a commons is not an intrinsically democratising or emancipatory assemblage, as its nature and evolution will be determined by dominant values and valorisations. A commons in which commoners act to sustain their community by excluding anyone with different culture or values will be a racist commons. In the context of a deliberately designed data commons, we (the designers) have the opportunity to design features into the system that encourage, constrain or discourage particular values and valorisations.

Networked learning in a data commons

In the content of a digital (data) commons, there are significant conceptual parallels between these notions of the importance of relational values, commoners and communing and the NL conceptualisations learning through connectedness (Networked Learning Editorial Collective, 2021) and students as producers (Carmichael and Tracy, 2020; Neary and Winn, 2009). In their exploration of the role of open, linked data in NL, Carmichael and Tracy (2020) describe student production as "participation in the co-production with others of new material, digital and knowledge artefacts and networked assemblages" (p. 120). Replacing student with the more general term learner, there is a connection that can be made between the data commoner who produces and sustains a data commons

through interactions with data and other commoners, and the learner who co-produces through interactions with resources and other learners.

However, it is important that these NL ideas need to be plugged into (or refracted through) additional conceptions, in order to avoid normalising and totalising conceptualisation of value. For example, within the NL community, it has been suggested that "new forms of production, including the production of knowledge, be reoriented towards the use value, rather than the exchange value, of what is produced, resisting the tendency ... for relationships between suppliers and users of knowledge, particularly in digital environments, to assume the same forms as has existed around other forms of commodities" (Carmichael and Tracy, 2020, pp.118-9). This echoes the limited conception of value and valorisation identified in our discussion of Open Data above, as well as reinforcing categories such as supplier, user and commodity. Indeed, Carmichael and Tracy (2020) themselves note McLaren and Jandrić's (2015) critique suggestion that educators (or in our case, sociotechnical system designers) need to recognise and resist the appropriation of technological developments by capitalism, and to develop alternatives.

Carmichael and Tracy (2020) suggest that where Open Data are used in a networked learning assemblage, there is a need to better understand literacies in the context of both data production and data consumption. This may be an important distinction in considering the design of a data commons, where commoners create and share, as well as make use of, data. Here, we understand digital literacies as situated, nuanced and networked practices (Gourlay and Oliver, 2016), not as a set of technical statistical, numerical and representational skills.

The Data Commons Scotland Project

All this begs the question: how can those with privileged access to funding, data, expertise and time (e.g. academics, data scientists, IT professionals, UI/UX specialists) design a sociotechnical data ecosystem that creates or enacts a networked, decolonial data commons? We believe that this requires the recognition that data commoners are essential to the maintenance and production of the commons, and that potential commoners will need and want to make sense of data on their own terms, in ways consistent with values of all types (political, ethical, aesthetic as well as use and exchange) as they emerge and evolve within the commons.

In the Data Commons Scotland project, we have been exploring the question of how to design such a system in practice. Recognising both the importance of relational values to a commons and the non-value-neutral character of technology, we start with an explicit articulation of the values that we, as designers, bring to the project. We value equity and sustainability above economic productivity; we value knowledge sharing but at the same time value being able to put limits on what is shared; we value a plurality of perspectives as a way of enhancing our own understanding as well as that of others; and we value capacities to exercise judgement, make decisions and take actions that align with our values. As a result, we aim to create a sociotechnical system that not only enables access to, but actively encourages increasingly sophisticated and critical use of, ownership of and production of (open) data.

We also recognise the plurality and contingency of commons and as such, recognise that principles for the design of one data commons will depend (to a greater or lesser extent) on the "topic" or focus of the commons – that is, on an initial category decision that identifies what will count as data-of-interest. For Data Commons Scotland, we have chosen data on Scotland's waste, including diversion of waste through recycling and reuse. We have chosen data from the waste sector for the following reasons: (i) waste data may be produced and published by many actors (e.g. government, companies, public authorities, third sector organisations and individuals); (ii) a focus on sustainability, the reduction of pollution and the circular economy is consistent with our own values; (iii) waste data may have a range of values or be valorised in different ways by different people, including (but not limited to) value as a means of better understanding our environment and society, value in terms of holding waste producers and/or authorities to account and value as a potential expeditor and even creator of circular economic activities. Our challenge is to find ways to connect disparate sources of data together as linked common goods in a networked commons designed to be inclusive to non-experts; and to design a sociotechnical system that not only meets the existing needs of multiple users, but also recognises and builds on their capacity for learning.

Research and design processes

Our research and design processes have themselves been more fluid and emergent than following a fixed protocol or methodology. However, we have drawn on some prior traditions, most notably in the participatory, co- and

values-sensitive design movements.

Once we had established both the particular context for our putative data commons and our specific aims, we started to explore the ecosystem of already-open data on Scotland's waste. This led to a series of observations that need to be considered in our design of a sociotechnical commons system:

- There is a significant body of data on household and commercial waste collected, curated and published by the Scottish Environment Protection Agency (SEPA). However, these data are published in places and in formats that require high levels of pre-existing knowledge: knowledge of what data are collected, knowledge of how they are collected, knowledge of how to navigate the data interface and knowledge of how to interpret the data. These data are open but in many ways, and to many audiences, inaccessible.
- There is little consistency in the nature, format and location of waste data published by local and city authorities. Thus a person who has learned how to extract and understand data published by one authority may have to start their learning afresh when attempting to locate and interact with data published by another authority.
- There is a significant gap in data on the diversion of waste through re-use or repurposing.

At the same time, we began what are ongoing processes of co-research and design with a range of potential contributors to or actors within the putative commons. These include people and organisations that already publish data relating to Scotland's waste stream – at present, predominantly SEPA, the Scottish government statistics unit and local authorities. They also include people and organisations that do or might productively interact with waste data – given our own alignment with learning and action, this includes waste data specialists, local government, recycling companies, environmental consultants, teachers, librarians, third sector organisations, environmental activists and private citizens with no particular prior interest in waste. To ensure ongoing growth of the commons, we also consciously attempted to include people and organisations that might be able to add new data to what is already available – that is, to re-produce and create common data goods.

We began with some fairly standard approaches from the traditions of participatory and co-design (Simonsen and Robertson, 2013), with in-depth, semi-structured interviews and workshops intended to explore what people would want and value, as well as pre-existing capacities, in relation to a digital platform focused on Scotland's waste data. The interviews and workshops also provided opportunities to explore some of the features such a platform needs to have to attract users and thus contributors and thus create the conditions for a commons to emerge. The interviews enrolled a broad range of people into the design process. One workshop enrolled people working within the waste sector (as data processors, waste collectors or waste processors). Another attempted to enrol people with an interest in Open Data. These workshops were designed following initial analysis of the interviews and the exploration of the already-published data described above, and included explorations of both common barriers to opening up waste data, and the desirability of suggested features such as recommender systems, chatbots and tools for assessing data reliability. At the time of writing, we have also conducted follow-up interviews and observations of people's responses to some alternative look-and-feel approaches; as with the initial interviews, these attempted to enrol the perspectives of as wide a range of people as possible.

Spurred by the lack of publicly available data on waste diversion through reuse and repurposing, we have also been working with three non-profit organisations in the reuse sector. As well as dialogues to find out about their values, aspirations and preferences, we have also been helping them to process and re-present the data they generate and encouraging them to make it publicly available.

Emerging design considerations

The "data" generated in the processes described above are inevitably refracted through our own understanding and value-relationships. This process gives rise to two distinct sets of design considerations for a putative waste data commons.

Design consideration arising from interviews and workshops

The initial interview data were analysed using the methods of phenomenography (Åkerlind, 2005), which explicitly embraces variation rather than seeks to define typical or average experiences and understanding. This approach was chosen in an attempt to retain the plurality of experiences of and attitudes to both waste and data that the interview participants expressed. We thus sought to allow what might otherwise be considered the

subalternate perspectives of people who are not and, importantly, *do not wish to become* data or waste experts to be active design considerations.

The analysis drew out a range of perceived, anticipated and imagined values or valorisations of waste data and interactions with such data. Interestingly, discourse about the potential economic exchange or use value of waste data was almost entirely absent. Instead, interviewees described accessible data on Scotland's waste as being of value in order to expand one's own knowledge; acquire knowledge to inform one's own decisions and practices relating to waste and resources; acquire knowledge to persuade others to change their practices; to improve existing waste management processes; to create novel processes and solutions; to hold authorities to account; and to empower others to hold authorities to account. For some, though, the dangers of unintentional misinterpretation and even intentional misuse or misrepresentation outweighed the potential values of data use.

The results were used to create personas and scenarios[9] that reflect the complexities of potential waste data commoners lives and, in particular, their values and interests (Wilson et al., 2018). The scenarios emphasise that engagement with the platform might be driven by more than one interest, and that the platform itself might be designed to encourage increasingly critical and creative engagement with data. They describe how different audiences may hope to interact with a platform supporting a waste data commons, as well as providing examples of encounters they may have that would make this process easier or more of a challenge.

The personas and scenarios, combined with the discussions at the two interactive workshops, allow us to identify some key features that a waste data commons needs to include in order to stand any chance of enrolling a range of our interviewees as waste data commoners. As well as the ability to access data in simple formats, view graphical representations of data sets, and select data sets to compare, these key features include:

- metadata including information about data provenance and history
- metrics or other indicators of data reliability and confidence, plus mechanisms to enable non-experts to engage with data uncertainties
- a recommender system or other means of becoming aware of different data sets
- mechanisms for people to contribute and publish their own content, whether in the form of data sets or stories
- mechanisms for people to communicate with each other.

It is in response to some of these design considerations that NL concepts may be brought into play. If the various data sets that we can make available are conceived of as a network of knowledge and learning resources, then the "value" of the network lies in the value-relationships that connect people to resources (and resources to resources). That is, the assemblage of the networked data and people can become a data commons if people (waste data commoners) are able to connect with data in ways that add to their knowledge, their capacity for decision-making, their sense of agency and their capacity for persuasion – i.e., in ways that align with the values expressed to us in our design research. It is thus up to us, as designers, to find ways of using the relationships between data sets and different uses of data sets to suggest pathways between and within them. It is also up to us find ways of allowing our potential data commoners to explore provenance and history in ways that allow them to develop their own judgements in relation to reliability and trust.

Design considerations arising from work with third sector organisations

One of the most important outcomes of our work with non-profit organisations working in the reuse sector is our own far deeper appreciation of their relationships with and valorisations of data. In all three cases, the people in coordination or management roles identify significant ways in which the collection and presentation of data about their own organisation's activities is important to them. The biggest driver here is funding (in a somewhat ironic echo of academic life). Two of the three organisations have no core funding and one has only limited ongoing funding; all must therefore continually engage in funding-seeking activities. In the contemporary era of accountability and transparency, engaging in something that is in some ways self-evidently worthwhile as a social and community good, such as reducing food waste and providing a community food service, or reducing the disposal of furniture and white goods in landfill and simultaneously making such goods available cheaply within the community, is no longer enough. Instead, organisations such as these must *account* for the economic and social good they create, and increasingly also the CO_2(e) emissions they avoid. Thus there is an imperative to count and

[9] The personas and scenarios can be accessed on the project's website at https://campuspress.stir.ac.uk/datacommonsscotland/resources/

weigh, to apply carbon-equivalent formulae, and to serve up numerical data to potential and existing funders. Our third sector partner organisations thus have ambivalent and sometimes tense value-relationships with their own data, as unfavourable power dynamics force them into particular behaviours.

Despite this, all three organisations display a genuine desire to collect and curate their data "well", so that the data they acquire and re-present communicates the various goods they believe they are achieving, as well as in order to demonstrate carbon-reduction commitments that are conditions of their funding. It is here that parallels can be drawn with the NL concepts of students as collators, assessors and producers of knowledge resources. Staff and volunteers with varying degrees of confidence and interest in data and digital systems are already enrolled in "hybrid set[s] of reconfigurative practices … the creation and coordination of socio-material assemblages, involving acquisition, curation, destruction and creation" (Carmichael and Tracy, 2020, p. 128) of texts in the form of paper-based records, spreadsheets, and digital documentary reports. The implications for our putative data commons design include:

- A need for spaces in which potential commoners need to be able to make sense of and identify value in their own data in their own ways, for their own purposes, before making it publicly available to others.
- A need for mechanisms to assist in the collection and curation of data that they themselves identify as useful.
- Guidance on the standards and metadata needed if data are to be made publicly available.
- Any manipulations, conversions and re-presentations (for example as carbon-equivalent data, or other equivalence-assertions) need to be both explained and justified

As above, it is now our responsibility as technical and pedagogical designers to accommodate such considerations while bearing in mind both the values and valorisations of waste and re-use data expressed to us in our earlier participatory design activities and in our ongoing work with third sector organisations. Here, we face the challenge of designing in the face tensions imposed by the knowledge and agency-seeking valorisations expressed by all our participants, and the competitive and new managerialist context the organisations find themselves in with respect to funding.

Discussion and conclusions

In conclusion, in this paper we have described a project that responds to the call made by Gourlay in her contribution to the Networked Learning Editorial Collective's (2021a) recent work, by exploring a potential learning setting "in terms of the actual, situated, more-than-human 'mess' of specific contexts, disciplinary content and cultures, and also the wide diversity of ways of engaging" (p. 328), including the possibility of reluctance and avoidance.

The design considerations we have outlined cover a broad range of features and functions. However there are some reoccurring themes that emphasise the importance of designing with and for a plurality of contingent perspectives and experiences. Echoing Carmichael and Tracy's (2020) findings in relation to students, we see that the "digital literacies" needed by our participants are not only situated social practices, but are also practices "shaped by their own concerns, intentions and existing network relations" (p.130). We also see that there are very real tensions that we need to face up to, for example relating to encouraging particular pathways through the data sets, which could easily lead to a "people who bought this also bought" normalising tendency; making pre-determined value judgements about the reliability of data, which might unintentionally privilege one form of value over another; and encouraging more data use by third sector organisations for whom data have become a critical financial concern, displacing human judgements about the ethical, political and cultural values of their projects.

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SHORT PAPERS

The Role of Power Relations and Identification in Collaborative Knowledge Construction at Single Gender Online Forum

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Abstract

This short paper describes a research project that aims at exploring how identification and power relations contribute to learners' knowledge construction in single gender online forum. This multiple case studies take place at five online classes in two female universities in Saudi Arabia. Data is collected from semi-structured interviews and group discussions. Qualitative content analysis of online discussions is used to investigate the collaborative knowledge construction within online learners utilizing Gunawardena et, al. 1997 tool. In addition, Foucault discourse analysis is used to explore learners' power relations and identification.

The initial findings of the pilot study suggest that learners have imposed several power relations strategies in the discussion's forum such as maintaining norms of online discussions; (2) maintaining norms of a good classmate; (3) criticizing, comparing and assessing each other's posts; (4) displaying oneself personal information; (5) checking others' intellectual activities and messages; (6) comparing between oneself and others' actions and way of thinking; (7) categorizing oneself and others ; and (8) excluding and including others. These behaviors were organized under three themes normalisation, surveillance, and classification. Initial findings also showed that participants revealed parts of their identities while interacting with each other. The research will continue to investigate how these practices are influenced by the social and cultural settings and how this contributes to the quality of knowledge construction in online discussion forum.

Keywords

knowledge construction, identification, power relation, Foucault discourse analysis.

Research Context

This study takes place at two female universities in Saudi Arabia. Online learning adaptation in Saudi's universities started as a reflect to the universal advocacy of online learning worldwide. As such many universities have shifted their practices from traditional face to face educational systems to the online learning system. Saudi universities are eager to facilitate learning through online technologies. However, the learning and teaching practices in such environment are not given equal attention**.** According to Al lily (2011), much of academic research examining the introduction of the online learning into Higher Education in Saudi Arabia is conducted at the level of administrators, technicians and teaching staff, with a little consideration to students. Hence, Al lily (2011) emphasized the importance of conducting more research in what he called "the bottom-up approach." In addition, much of research in online learning in Saudi Arabia focused on the affordances of the technology with a little attention to pedagogy as well as the cultural and social setting (Mehana, 2009 cited in Al lily, 2011).

Considering the uniqueness of the social life in Saudi Arabia which until recently was characterized by complete separation between female and male in school, workplace, and even in online classes, the exploration of this context becomes more important. In general, educational systems in Saudi Arabia are strictly segregated at every level of education– including the level of instructors. Males are taught by males and females are taught by females with very scarce, exclusive mixed schools and universities. Gender separation is not limited to the educational sector, but it appears over other social situations such as banks (Alhazmi, 2010) and governmental departments. There are many reasons for this separation. However, the most significant reasons are

culture and religion. Because very little is known about this context, I argue that it is worth investigating. This claim of the importance of the Saudi context is also supported by previous literature that called for studying learners' identities in online learning context (Freeman and Bamford, 2004; Oztok, 2016; and Ke et al. 2011). According to Freeman and Bamford (2004), knowing various aspects of individual identity may contribute to understanding other facets of learning such as learner's engagement, motivation, and style. Ke et al., (2011) also argued that when interacting online, learners negotiate what they know about a subject and, at the same time, they reveal and share parts of themselves. Oztok (2016) asserted that identity is vital in the process of knowledge construction. He pointed out that although there is no recognisable scheme on how identification happens during the knowledge construction process, there is evidence that identity plays an important role at each level of the process. Learners can effectively build knowledge and properly position themselves in interactive discussions when they know who other individuals are as well as when they know how to present themselves (Oztok et al. 2013). Although the aforementioned research attempted to examine the relation between knowledge construction and identity, they did not address how power relations contribute as hidden forces to the construction of an interactive online community that foster knowledge building. Hence, I argue that exploring the condition and the circumstances that foster knowledge construction in online learning forum is crucial.

Aims and Objectives

The study aims to answer the following main question: what social events are involved in learners' construction of knowledge in single-gender online forum, and how do these relate to their identities?
From the above main question, the research will try to answer the following sub-questions:

- What are the power relations strategies that appeared in the students' interactions on the online discussion forum?
- How does the power relations between students in single-gender online forum contribute to their knowledge construction?
- How does learners' identifications in single-gender online classes contribute to their knowledge construction?

This research will most likely contribute to existing knowledge by helping online instructional designers and developers to design online learning courses that provide more equal experiences and better online discussion environments for all students. Moreover, I hope this research will contribute to the understanding of the hidden forces that shape and influence learners' interaction in single gender online context.

Design

The project is currently in the first stage of my PhD research. This research falls under the qualitative research approach in which I seek to understand the experiences of online learners in an online discussion forum. I aim to explore who benefits as well as who is marginalized by the research context by exploring the hidden forces that influence learners' knowledge construction in such an environment. My position in this research is described by Ravitch and Carl (2016) that is the truth is multiple, subjective, and contextual. Thus, participants in the study will be subjected to semi-structured interviews in which the research findings will be multiple and dynamic. The research will utilize both deductive and inductive qualitative approaches to answer the research questions. Because the research context is conducted in Saudi Arabia, my home country, I consider myself close to the participants as I share with them the same culture. Indeed, some subjectivity, which is a quality of qualitative inquiries, will be part of data interpretation. However, several procedures will be implemented to ensure research validity, such as reflexivity, generating a detailed, thick description, and having a peer review.

The Research Methodology
This study is a multiple case study that includes multiple groups. Each group is a case by itself because it has characteristics that differentiates it from other groups. Multiple cases methodology will allow for wider exploring and understanding of the research problem and context. Hence, this will contribute to answering the research questions and the concepts emerged from them. It also will help to understand the differences and the similarities between the groups under study.
The Participant Selection:
The sample in this research is purposeful based on the availability of individuals and their situation.
The Data Sources and Data Collection Tools
Two instruments is utilized for data collections. The first one is the semi structured interviews to obtain understanding of individuals' current experiences, and how they comprehend and structure the reality of the online discussions (Ravitch and Carl, 2016). The second tool is the group discussions. In most online learning

environments, learners exist by text on a screen. In this sense facial expression and body language that convey emotion are almost absence. Therefore, the entire dynamics of the online classrooms can be understood by the analysis of the discussion forum. In the selected courses of this research, the students are required to participate in a weekly forum as part of their coursework requirements. Each week, the instructor assigns a topic for students to discuss. Each studnet is required to make at least three posts to the forum – with at least two inputs as feedback to the other participants. Those discussions in the online forum will be collected and analyzed using a qualitative content analysis tool.

Pilot Study and Preliminary Findings

The pilot study was conducted to investigate the feasibility of this research as well as to pre-testing the research data collection instruments which is here the interviews and the discussion threads. The course selected for the pilot was part of a diploma certified in online learning for postgraduates at Princess Nora University. All the students in this course have completed their bachelor's degrees. Therefore, participants vary in terms of age, academic background, and experience. The total number of students who enrolled in the course was eight students. However, only three agreed to be part of the pilot study. Following more details of the process of data collection and analysis:

First: the interviews:
I conducted three interviews with three female students (N, M, and H). Each participant was interviewed separately. The interviews lasted between 40 to 60 minutes. All interviews took place online using Zoom conference video. In the interviews, I asked the interviewees a group of questions that elicited from five main questions:

1. When do you feel you have been successful in participating and learning in the online forum?
2. When do you feel you have failed in participating or learning in the online forum?
3. What did you find difficult or what hinders your participation?
4. How do you feel toward other learners' participations

Each interview was transcribed and translated by me and a colleague to insure validity. Interview data were source to investigate both power relation and identification.

To start the analysis of power relation, I followed a deductive qualitative research approach in which Foucault Theory of Power Relations was applied as a starting point for the analysis. The analysis process follows the following steps:

First: The Conceptual Framework; I conducted a literature review to determine what aspects of power relations and identity to be investigated. In terms of power relation, I found Foucault theory is appropriate for this research because it investigates power in several directions in the sense that it does not only study power that flows from top to bottom, but also the power that flows from bottom to top and so crosswise (Kelly, 2009). Henceforth, Foucault's analytics of power is appropriate for the context that considers the crosswise micro-acting of power relations such as students' interactions. Further, Foucault's theory helps to view higher education as a social institution that spreads power among its members in which none of the members can attain complete authority that subordinates others (Peach and Bieber, 2015). Lee (2020) argued that using Foucault theory in Technology Enhanced Learning research can provide a better understanding of the complexity of the hidden power relations in learning and teaching practices. Therefore, I adopted Gore (1995) conceptual framework based on Foucault theory of power to explain key constructs of Foucault ideas. Gore (1995) conceptual framework consisted of eight strategies which are surveillance, normalisation, exclusion, classification, distribution, individualisation, totalisation, and regulation. In this pilot study, however, not all Gore's themes were recognized. Only surveillance, normalisation, exclusion, classification were present. This is due to the small sample of participants. Power strategies in Gore's framework are the main theme for data analysis.

Second: the Codes; based on the conceptual framework, I developed set of codes, and each code indicates a particular behavior that can fall under the predetermined power relation strategy (themes) specified at the conceptual framework. A review of Gore (1994), Gwittar and Carter (2014), and Marwick (2012) works aids this process of pre-coding. The outcome of this stage is summarized in table (1).

Third: Data Analysis; the set of themes and codes were applied to the analysis of the data collected from interviewed. This involves the revision and the conformation of the codes. This process also includes inductive inquiry in which some new themes and codes might emerge from data.

Fourth: Finding; in this stage I found that participants practiced three power strategies over one another. Those are normalisation, surveillance, and classification (excluding and inclusion). In Normalisation, for example, the data showed that the students used a set of techniques to impose their authority on each other, they (1) maintain norms for online discussions; (2) maintain norms of a good classmate; (3) and criticize, compare and assess each other's posts. Here are some quotes of how participants maintain norms of a good classmate from the interview. Traits such as thoughtfulness and helpfulness are considered norms in the Saudi community. As such, participants follow these norms in many of their interactions. For example, asking tricky and complex questions is considered a violation of these norms since it may cause discomfort and embarrassment. Therefore, participants showed many times in the interview their obligation to not put their peers on the spot. For example, N said that she avoided interacting with one specific student in the class since she tended to privately message N when N commented on her posts, asking what to say in reply and how. N decided not to make any further comments on this student's posts so as not to humiliate her and thus violate the behavioural norm.
Here is an excerpt from N's interview:

> ***Researcher: Have you ever corrected your classmates or helped them on their posts?***
> *Participant: I think they don't like the questions I ask. Some girl used to send me a private message asking for my own answer each time I asked her something in the discussion forum. I felt that my question was difficult… Sometimes I had remorse; I would regret asking her questions and tell myself not to do so anymore.*
> ***Researcher: Why did you have remorse?***
> *Participant: I had remorse especially after asking this specific girl. I think she couldn't understand my questions. I didn't want to embarrass her again so I stopped asking her.*

H faced the same situation but did not explicitly state whether she avoided this specific student in future discussions. However, she implied later in the interview that she avoided students who did not like to be asked questions.

In M and H talks, they were trying to display understanding and consideration towards their classmates. They do not want to embarrass or annoy them with criticism. On the other hand, their classmates held the assumption that fellow peers would undoubtedly extend their help in answering the discussion forum questions.

Additionally, these excerpts portray examples of classification behaviors such as exclusion and inclusion. When the participants mentioned that they avoided interacting with a particular student, it showed behaviors of exclusion. Participants also practiced other classification behaviours such as categorization based on academic level or experience. For instance, N classified herself as an experienced student and her classmates as non-experienced. Here are excerpts from N's interview:

> ***Researcher: Did you ever feel that you were more capable than your classmates when it comes to discussions?***
> *Participant: Sometimes yes. I would spend my free time reading my classmates questions wishing they used a different format.*
> ***Researcher: So, you would assess them?***
> *Participant: Yes, because I have worked in the field. I believe I am more informed than they are but not more intelligent.*

In terms of Surveillance, the data showed that students display personal information; check others' intellectual activities and messages; and compare between oneself and others' actions and way of thinking. For example, N mentioned that she was inspired by H's answers and thus tries to expand on and benefit from H's new ideas. Here N implied that she indirectly compared her own writing style with H's writing style and that this resulted in N's improving her own way of writing and thinking. Here are excerpts from N's interview:

> ***Researcher: Where there any discussion that you benefited from and learnt something new?***
> *Participant: I do not remember exactly but I liked H's discussions a lot; they motivated me to ask her.*

Researcher: Did you feel that she would add new things to the discussion?
Participant: Yes.
Researcher: Do you remember learning something new from H's discussions?
Participant: Not exactly, but I would be enthusiastic when the teachers asked for a new discussion. The first student to discuss would be H. In all the courses, the way she thinks and states her points is excellent. It reflects someone who really understands what they're writing. She inspires me and offers opportunities for new questions and new aspects. Sometimes, among the ideas she states in the discussion, you find an idea that raises a new question in your head.

The analysis of the interview also showed that participants revealed parts of their identities while interacting with each other. To start the analysis of participants identification, I utilized an inductive approach in which themes emerged from the data. Hence, professional identity, motherhood identity, and institutional identities were recognized in the analysis.
For example, N is an intellectual person who wrote articles at a very young age and worked as a news editor for several years. This professional identity of N was cleared in the interview and her participation in the forum. For example, N stated that she often evaluates, reads and corrects her colleagues' posts in discussions unconsciously and that she enjoyed doing this. This professional identity of N made her selective in responding to her colleagues as it appears from her interaction in the forum that she chooses the students with whom she wants to interact. In the interview, she stated that she interacts with people who write well-organized posts and avoids those who do not write clear and organized posts.

Second: Group Discussions
The purpose of analyzing discussion threads is to identify where and to what extent knowledge construction took place in learners' interactions. To do so, I read participants' threads several times and tried to identify threads with knowledge construction using the model of Gunawardena et al. (1997). After selecting the required thread. Messages in the thread that includes statements of opinion, clarification, or example were coded as phase (1). Messages that show areas of disagreement or negotiation were coded as phase (2 + 3). Messages that show an application of new knowledge or changes in knowledge or ways of thinking were coded as phase (5). Initial findings showed that most students participation to the forum were in phase (1) with some posts in phase (2 +3).

The research will continue the analysis by drawing a connection between participants' power relations and identifications to the process of knowledge construction.

Themes (categories)	Sub-themes	Reference
Surveillance	Display one's personal information	Albrechtslund (2008) Marwick (2012)
	Compare one's own and others' actions and ways of thinking;	Gore (1995)
	Check others' intellectual activities and public posts	Marwick (2012)
	Search for others' backgrounds and personal information	Marwick (2012)
	Comment on others' news and updates	Albrechtslund (2008)
Normalization	Maintain the norms of a good relationship;	Gore (1995)
	Maintain the norms of a certain task;	Gore (1995)
	Criticise, scold, and mock anyone who violates the norm;	Guitter & Carter (2014)
	Engage in corrective training	Guitter & Carter (2014)
	Provide a model that maintains norms to be identically followed;	Guitter & Carter (2014)
	Make a tribute to all who follow the norms;	Guitter & Carter (2014)
	Compare and assess oneself and others in accordance with the norm	Guitter & Carter (2014)
Classifications	Categories others based on their academic achievements	Gore (1995)
	Categories others based on their experiences	Theme emerges from the data itself
	Exclude certain members from one's social circle	Snyder (1984)
	Include certain members to one's social circle	Snyder (1984)

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Game-based Networked Learning

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Abstract

Designing and analyzing learning experiences in non-formal contexts can be challenging, even for those with educational training. The challenge is more significant if the priorities include educational ideological bases or an specific type of educational vision. The DALI project (Data Literacy for Citizens) has the primary goal of offering Data Literacy learning experiences specifically designed for adults in non-formal educational contexts. With this goal in mind, and considering the social and material realities of the target participants –their needs, diversity, interests and cultures– the project combines two of the most promising pedagogical approaches nowadays: networked learning and playful learning.

This short paper outlines the pedagogical vision underpinning our efforts to integrate both approaches into a set of strategies and resources, in other words, the principles and ideas driving the design of what is called in the project: Game-based Networked Learning (GBNL) experiences. In particular, we draw on both the Activity Centred Analysis and Design (ACAD) framework and the Transdisciplinary Model for Developing Game-Based Interventions. After reviewing key aspects of the theoretical grounds that define our understanding of educational uses of technology and game-based learning, the paper addresses critical considerations underpinning the adaptation of the ACAD framework in the planning of playful learning experiences. Thus, the paper outlines the main principles guiding the design of DALI experiences, dividing them into the three design areas established by ACAD: set design, epistemic design and social design.

The ambition of this approach is to serve as a pedagogical and educational statement to guide valuable actions to improve other adult learning approaches.

Keywords

Activity Centred Analysis and Design (ACAD); Networked Learning; Connected Learning; Playful Learning; Game-based Learning

Research context and justifying

This paper presents an innovative approach that combines principles of both playful learning and networked learning with the aim of fostering the development of adults' Data Literacy in non-formal learning contexts. Devised as part of the Data Literacy for Citizens (DALI) Erasmus + project (Strategic Partnership 2020-1-NO01-KA204-076492), the approach will inform the design of a set of flexible pedagogical strategies and resources

devised to facilitate Game-based Networked Learning (GBNL) experiences, to be piloted in 2022 across diverse populations in four countries (Germany, Norway, Spain and the UK).
This work starts start from the conviction that learning design is not just a technical task of connecting educational objectives with a teaching-learning situation and, therefore, is far away from being neutral. It entails defining the aspects that must be designed for every learning startegy, as well as the educational features to be followed when designing the learning situations in order to foster specific educational approaches and goals.
Additionally, supporting the development of Data Literacy, in the case of this project specifically for adults, requires to build an educational proposal based on up-to-date knowledge as defined by an emegent and rapidly evolving field of expertise. Therefore, this paper aims to define the pedagogical ideas that will be considered during the designing of our GBNLS, taking into account the main designing areas, as well as the educational principles that will guide them.

Theoretical perspectives

Learning and Technology

Our approach is underpinned by the principles of networked learning (NL), which means we understand the development of competencies as an emergent activity aimed at "foregrounding learner agency", where expansive learning, reflexivity, and a shared commitment among participants bring about a "distinctive dynamic potential" (Networked Learning Editorial Collective (NLEC), 2020, p. 30). More specifically, it adopts the Activity Centred Analysis and Design (ACAD) framework (Goodyear et al., 2021) to organise the design components in the most straightforward and most precise possible way while enabling the design of resources to deliver complex learning experiences. Likewise, the approach draws on the principles of Connected Learning (CL) to inform the creation of new spaces where learning happens, helping learners to connect with people and communities with the same interests by means of "openly networked infrastructures" (Ito et al., 2020, p. 43).
Learning experiences are conceived taking into account the social and material realities of target participants, considering their needs, interests and cultures (Ito et al., 2020). They are approached as situated experiences that provide an "infrastructure for shared critique, inquiry and the ongoing design of new tasks, technologies, resources and relationships" (Networked Learning Editorial Collective (NLEC), 2020, p. 10).
Working together (i.e. the social dimension of learning) is crucial to both NL and CL. Human relationships are the main basis of these approaches, which include "trust, power, identity, belonging, difference, affection, reciprocity, solidarity, commitment and time", not just as a strategy (Networked Learning Editorial Collective (NLEC), 2020, p. 3), but as learning subjects themselves.

Playful and game-based learning

Games are valuable means through which play can be observed and facilitated in a structured way, which can lead to purposeful and meaningful engagement and actionable feedback. Upton (2015) suggests that "the use of games is a good starting point for an investigation of play because the formality of their rules makes the machinery of play easier to observe and analyse", where "games are a particular manifestation of play, not its totality" (p. 11). Following Whitton (2018) and Tekinbaş & Zimmerman (2003), there are at least three main aspects regarding the use of games that are particularly relevant to the non-formal adult-learning contexts where DALI operates:

- The active construction of failure and creating a learning environment in which learners feel that they can fail, which enable participants to overcome a potential lack of self-confidence, to immerse themselves in the spirit of the game and even to adopt a "crazy" (i.e. thinking out of the box) attitude.
- The immersion of learners in the game releases their imagination and fosters creativity. By engaging in a fictional world, they can address real life problems from a new perspective.
- Playfulness implies that activities are voluntary and intrinsically motivating; participants enter and shape the rules, actions, and boundaries of the game space through choices (the first one being to participate).

The general development process of an applied game should be iterative and participatory, as defined by game development life cycle –GDLC– (Ramadan & Widyani, 2013). For applied games, the added complexity is in balancing both entertainment (engagement) and the serious outcomes (learning, impact). In particular, the playful learning dimension of DALI will be directly informed by the 'Transdisciplinary Model for Developing Game-Based Interventions' (Arnab, 2020).
The gaming experience is already in itself a compelling context for learning and reflection (Arnab et al., 2019; Postigo Fuentes, 2021). It is not the games themselves that are powerful, but the pedagogical transformation –in formal and non-formal contexts– and learning that can occur as a result of using games in a meaningful way.

ACAD for playful learning experiences

Structured using the ACAD framework (Goodyear et al., 2021), the networked learning experiences devised as part of DALI will follow a simple structure allowing us to (at a minimum) situate them physically, socially and epistemically. In the following sections of the paper, we will discuss the principles guiding the design of DALI experiences, dividing them into those three key design areas established by ACAD:

Set Design

The ACAD framework explicitly recognises that learning activities are physically situated, and the set design shapes the conditions of the space where learning takes place and the materials used to enable it. This part of the design highlights "(a) the influence of qualities of a place and (b) the way that physical things – such as tools and other kinds of artefacts - become woven into and affect activity" (Goodyear et al., 2021, p. 448). In the case of the GBNL experiences, the material conditions –games' objects and spaces– constitute the playful set design.
Games resources-materials are assets that help the player to achieve their goals. Examples of resources could be lives, units, health, currency, actions, power-ups, inventory, special terrain and time. Other elements that help in the physical situation are boundaries, the premise, and the game's story (Fullerton, 2019). These resources and spaces can be completely fabricated, or they can be based on real-world objects. But even in those cases where they are based on familiar objects, they are only abstractions of those objects and still need to be defined in the rules as to their nature in the game (Fullerton, 2019).
The set design is about the tools and resources themselves and the differences in activities that emerge from the combination of those resources and places. We should consider the relationships between these elements because depending on how we combine them we will get a result or another, and all of that together creates a complex new whole. Therefore, the creation of the DALI experiences' set design should consider the importance of creating what Ito et al. called "openly networked infrastructures" (2020, p. 43) that help learners to connect with people and communities with the same interests; in this way, they create new spaces where learning happens.

Epistemic Design

When the ACAD framework defines the epistemic design, it refers to the kind of tasks designed for learners to do. This design remarks "(a) the role of knowledge-laden task specifications in giving students suggestions about directions in which to travel, and about good things to do on the way, and also (b) a recognition that students, as people, are always already doing several things, in which various forms of knowledge and ways of knowing play a part" (Goodyear et al., 2021, p. 448). Therefore, situated in a GBNL perspective, it is crucial to be precise on what the principles are that will guide this epistemic design in the DALI learning experiences.
From the epistemic point of view, games may turn into effective learning tools mainly because they allow inquiry-based spaces in which challenges are levelled. Games can be engaging contexts for systems thinking, design thinking, communication, creativity and innovation (Gee, 2007), as they (either analogue or digital) help learners identify patterns, think about future moves, predict outcomes of possible moves and learn from experience. Through explicit and implicit feedback (Postigo-Fuentes, & Fernández Navas, 2020), games also help players understand their progress, what they need to work on, and where they need to go next (Institute of Play, 2015).
Both rules and conflicts lead to outcome, which is often uncertain, although, according to Fullerton (2019, p. 72), "there is the certainty of a measurable and unequal outcome of some kinda winner, a loser, etc.". Nonetheless, the aim of the play is to play, and it is in this playful space that learning is constructed. They do not need to have a practical value. They take something familiar and give it a novel twist—a good way of inviting you to be playful. That means that it does not need to be just appropriatelly challenging –not too easy, not too difficul– but also fun. However, the concept of "fun" in a game might be tricky. Fullerton (2019) summarises very well how to design a good puzzle by saying that you need to build first a good toy: the player should have fun just manipulating the puzzle, even before reaching a solution. We would add that, even if players do not "solve" the game, during the action, some learning should appear. However, it must be borne in mind that 'fun' and 'learning' will only emerge depending on the circumstances defining each time a game is played in a situated context.
The most important part of the epistemic design must be the one related to the task and the challenge presented—in this case, the content about DALI—. Some procedures, rules and conflicts are related to mere concepts while others might be related to objects (cards, figures) or to material conditions (spaces, backgrounds, boards); therefore, the epistemic and set design of the game as a pedagogical strategy should happen in parallel.

Social Design

The ACAD approach recognises that the learning activity is always 'socially situated', meaning that what learners actually do during a period of time in which they are expected to be learning something is substantially influenced

by, among other important things, what the people around them are doing (Goodyear et al., 2021). Games are powerful student engagement and learning tools in classrooms (Hines, Jasny & Mervis, 2009), as they activate an iterative design process that is, by nature, collaborative and active—for trainers and learners–, and we understand that this characteristic is extensible to less formal educational contexts, and one of the keys to the potential of the game is the interaction of the player with the environment and with other players.

The DALI approach is grounded on two main ideas about the social part of learning: (1) "learning is most robust when grounded in a learner's cultural identity, part of a meaningful inquiry, supported by caring relationships, and reinforced across settings" (Ito et al., 2020, p. 26), and (2) diverse cultures must be represented (Gourlay et al., 2021).

In addition, it is crucial to take into account that DALI is aimed at a highly diverse population of individuals, covering different age groups (young adults, general adults, seniors), socio-economic statuses (workers, students, unemployed, retired) and cultural backgrounds. Therefore, DALI pedagogical experiences must be "inclusive, ensuring that everyone can participate providing different ways for individuals and groups to contribute" (Ito et al., 2013).

Next steps

Based on this approach, the DALI project will develop some design strategies that help our team to carry on the design of the activities, as well as serve to other researchers and practitioners to approach Game-Based Learning from a Networked learning perspective.

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Transitions in social media use and social media use for transition: A survey study of the shift from high school to college

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Abstract

High school and college students are known to be heavy users of social media. Much of their use is focused on peer social interactions and entertainment, but social media is also a potential platform for informal networked learning. In this study, we examine how college students used social media to learn about and prepare for college, how they use it in the university context, and how their social media use has changed as they mature and transition from one educational setting to another. Undergraduate students at a large public research university completed an online survey about their social media uses and perceptions. In terms of using social media to support the high school to college transition, preliminary findings show that for many students social media provided a valuable source of information about colleges, and in particular helped them plan and begin to build their social and activity networks in their new setting. Once at college, social media continued to help provide connections, serving as a source of information about campus events and supporting social connections. Social media was less frequently used as a means of networking with instructors.

Many students noted that their use of social media had changed in meaningful ways as they transitioned to college. These students indicated that their networks were now different, that their attitudes and uses had matured, and that they were better able to use their social media networks as a platform for awareness and change. Whether they perceived meaningful changes in their use of social media across the transition, most participants alluded to a desire to minimize drama, social comparison, and other ill effects of social media.

As data analysis continues, we will be exploring differences across platforms and relationships in college-related social media use based on intensity of use and sense of belonging. The study has implications for how institutions offer and support the development of social media networks among prospective and current students and provides insight into mindsets that can support or inhibit greater use of social media as a platform for informal networked learning as youth transition from high school to college and eventually on to careers.

Keywords

College, high school, informal learning, social media, social networking, transitions

Research Context

Most American teenagers have access to smartphones (Anderson & Jiang, 2018) and phone ownership and social media account acquisition are likely to co-occur so long as parents are agreeable (Dennen, Rutledge, et al., 2019) and even sometimes if they are not. Prior studies have found that high school students use social media to explore college and careers (Bagdy et al., 2018; Dennen et al., 2021; Rutledge et al., 2019) and universities have similarly recognized the importance of social media in student recruitment (Le et al., 2018; Peruta & Shields, 2018; Shields & Peruta, 2018). Social media use remains high among the college age population, too (Auxier & Anderson, 2021). However, for some students use in the college context is wrought with concerns of privacy (Shane-Simpson et al., 2018) and context collapse (Dennen & Burner, 2017).

Institutional approaches to social media differ between the high school and college contexts. In high schools, social media is an often unwelcome interloper. Schools attempt to monitor and curtail use (Shade & Singh, 2016) in order to distance themselves from perils such as the commonplace drama (Dennen et al., 2018; Marwick & boyd, 2014) and more troublesome phenomenon like cyberbullying. Teachers monitor student use from afar, but do not engage with students on popular social networking sites (Dennen et al., 2020). In higher education settings, student social media use is rarely monitored unless students are acting on behalf of the institution. Still, whether forbidden or ignored, social media exists as a platform where networked learning may occur.

For high school students, social media provides informal access to college campuses and students, allowing individuals to explore future directions. Once on a college campus, social media allows students to network with each other as well as campus offices and organizations. The potential for informal networked learning in this context is great, but is it realized? The purpose of this study is to explore how college students used social media to support their transition to college in terms of learning about colleges, planning their futures, and developing connections and accessing information on campus. Additionally, this study explores how college students perceive the development of their social media use over time, as they make this educational transition and mature.

Research Questions

This study uses an online survey to examine how youth use and perceive social media, focusing on how social media may support social and information networking needs during the transition from high school to college as well as changes in use as they make this transition. The research questions guiding this study are:

1. How did college students use social media to explore and prepare for college?
2. How are college students using social media for networked learning in the university setting?
3. In what ways do college students believe their social media use has changed from high school to college?

Method

Participants were recruited from a research study pool at a large public research university in the United States. The study pool connects students in participating classes to studies seeking participants, and students are given participation credit in their courses. Participation was voluntary, and students could opt to complete other studies or alternate assignments in their class. This study was approved by the institution's ethics board, and all participants provided consent. To qualify for participation individuals had to be 18 or older and enrolled as undergraduate students.

Data collection occurred across three weeks in November and December 2021 using an online survey. The survey was developed by the researchers and based on findings from earlier studies conducted at the high school (Dennen et al., 2020; Dennen et al., 2021; Rutledge et al., 2019) and college (Dennen, Bagdy, et al., 2019; Dennen & Burner, 2017) level. Question blocks included in this analysis focused on demographics, social media platform use, social media activity levels, and social media activities related to college transition and college life. Data analysis for this project is currently ongoing. In this paper, we report frequency distributions from the closed items and initial thematic findings from one open item.

Preliminary Findings

There were 159 participants in the study, representing majors from across the university. The average age of participants was 20.5. The average age reported for obtaining first social media account was 12.5 years with a range from 8 to 19 years. Instagram was most reported as the first account platform (52.8%), followed by Facebook (35.6%). Only one participant reported having no social media accounts prior to university, and at the time of the study 90% of the sample reported using social media for at least an hour a day

Social Media in the College Context (Research Questions 1 & 2)

Participants report that they were most likely to use social media to learn about extracurricular activities (89.6%) and social activities (87.2%) as they transitioned to the university setting. Social media was also helpful for social purposes, such as connecting with roommates (72.8%) and to a lesser extent future classmates (67.3%). Less frequent but still common uses of social media were learning about dorm life (65.6%) and majors (63.5%). When engaged in peer-oriented social network building activities, participants reported the highest degree of active participation (e.g., posting, commenting, and sharing), whereas when seeking information about opportunities and activities available at a university they were likely to be passive (e.g., search and read activities only). Once at

university, social media networks were deemed useful for finding campus event information (88.61%) and connecting to classmates (86.0%). This form of networked connection also helped participants develop a sense of belonging at the university (71.52%). Not surprisingly, social media was less likely to be deemed useful for connecting to instructors (34.2%), but it was considered a good source of information for class topics (60.8%).

Transitions in Use (Research Question 3)

To explore transitions in use, participants were first asked if they felt their social media use had changed in a meaningful way between high school and college; 60.3% indicated that it had. Additionally, most reported that their network size increased during college (65.2%), and they were twice as likely to report increased network size if they perceived a change in social media use since high school.

No Meaningful Change

Participants who reported no meaningful change in their social media use since high school tended to describe their social media use as primarily focused on maintaining social relationships and entertainment, often on a limited scale. In other words, they shared relatively little and mostly sought information about people they know, as indicated by these responses:

> I only use social media to stay and see what people that I have met over the years are doing or the people that I do not talk to anymore. I have a small circle but with a lot of friends, I get curious about what people are doing, who they are dating, and what kind of job they have.

> My social media use has not changed in a meaningful way because I still use it the same way I did when I was in high school. I post infrequently and I mostly just use it to see what others are doing with their life. I use it to stay up to date on celebrities and their lives as well as certain brands that I shop at or enjoy. I would not say social media is meaningful in any way, it is just a distraction for when I am bored and don't want to do other things.

A common theme was social media as a platform for comparison, which was deemed unhealthy as described by these two participants:

> I still use social media in the same way in which I did in high school. I don't view it as a positive thing, because I want to use social media in a more positive way. If I had a choice I would be more active on social media, because I think it is a great to meet people. However, social media can be a toxic place so I try to limit the way in which I use it. High school was a time where I compared myself to other people a lot. So I had to stop using it as much as I did in high school.

> My social media used to be used mainly for trying to compare myself to my peers at my school and to see what they were up to so that I can try to keep up with trends and just know all of the drama and friendship groups in high school. I think that I used social media in more of a negative way back in high school, but now I use social media more for just update purposes.

Note that in these responses, participants who said their use has not had a meaningful change nonetheless allude to change. Others also noted changes in tools (e.g., TikTok's rapid rise to prominence) and friend networks.

Meaningful Change

Three main themes were apparent among the participants who felt their use had changed in meaningful ways: change in network size and scope, maturation, and awareness. Changes in network size and scope were reported in both directions. For example, one participant shared how useful social media was for developing a new network and acclimating during the pandemic:

> Social media … allowed me to know what events were going on on campus and meet people that had similar interests to me.

Another, who narrowed her network in college, stated:

> I rarely ever post now … I could really care less if I get any likes at all and if people unfollow me. It has been really freeing in a way to relinquish the care and control that social media had on me.

This last example also connects to the theme of maturation. Other participants commented that they now "try to express myself more authentically" and have "come to be more confident in what I post." They shared about being more purposeful when they share online, often prompted by image-conscious extracurricular groups. They are also thinking about how social media use might support their future careers (e.g., "I now use it to look for future career options or extracurricular clubs") having been introduced to platforms like LinkedIn through classes. Finally, some participants shared how they have used social media to "voice my opinion and raise awareness for causes that are important" and "lead change in my community."

Future analysis

The survey instrument for this study also includes closed and open questions about specific platform use and perceptions as well as adapted versions of two validated scales. The first is Ellison's (2007) Facebook intensity scale adapted for general social media use and the second is the Simple School Belong Scale (Whiting et al., 2017), adjusted for a higher education context. Next steps in analysis include exploring differences across platforms and relationships in college-related social media use based on intensity of use and sense of belonging. We hope that these findings will contribute to the need for interdisciplinary research on social media use in educational settings (Greenhow et al., 2019) by focusing on activities and intentions outside the classroom.

Discussion and Implications

These preliminary findings suggest that social media serves a variety of functions for college students, with differences based on personal beliefs about social media and preferences related to network size. It also suggests that at the same time that institutions shift from monitoring and forbidding social media use, youth are learning to be more intentional and thoughtful in their use. In a large and diverse college community, it would be difficult to control use, and there are many benefits of having platforms to develop networks outside the classroom in support of various social and extracurricular pursuits. To this end, even students who did not feel that social media was useful for learning about, transitioning to, and thriving in college may have benefitted from social media networking through peers who shared and brokered information and connections found on social media. Additionally, based on prior experiences researching teen social media users, we believe it possible that some participants narrowly equated social media with peer and friendship networks and that deeper probing in an interview context might have yielded examples of how social media helped them with everyday life information seeking and network development and maintenance at college. This study has implications for how institutions offer and support the development of social media networks among prospective and current students, and provides insight into mindsets that can support or inhibit greater use of social media as a platform for informal networked learning as youth transition from high school to college and eventually on to careers.

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Designing for effective online Teacher Professional Development (oTPD) in building education by supporting beliefs, communities, collaboration, and development

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Abstract

This article reports the initial research findings from a large project on online professional development and upskilling of in-service building teachers' digital competencies. Based on the results from a preceding literature review and the pilot delivery of the course, three key factors for the design of effective online teacher professional development in building education — beliefs, communities and collaboration, and teaching development — are exemplified and discussed. The article concludes that the pilot was successful in developing the participants' technical skills and competencies to introduce technology in building education; however, the pilot did not significantly influence the participants' beliefs nor made them change practice within the duration of the course.

Keywords

Online Teacher Professional Development, digital competencies, online learning, educational technology, building education, networked lifelong learning.

Background

There is a pressing need to ensure digital competencies in higher education and the use of digital solutions for problem solving and collaboration in the building industry in Denmark (Bolig- og Planstyrelsen, 2020; Lillejord et al., 2018; Transport-, Bygnings- og Boligministeriet, 2019; Uddannelses- og Forskningsministeriet, 2020). As a consequence, the Kompetenceudvikling af Undervisere i Byggeriets Uddannelser (KUBU) project was initiated in 2020 to support the in-service building teachers' professional development of digital competencies across disciplines related to building, construction, engineering, and architecture.

KUBU is designed as a flexible online course in Brightspace (Figure 1) and consists of four modules: (1) Overview of the potential of digitalisation in the building industry (8 hours), (2) Training skills on specific digital tools in the building industry (8 hours), (3) Online pedagogy, online communication in teaching (8 hours); and (4) Developing online teaching focusing on digital technology in building industry (16 hours). Thus, the total workload is estimated to be 40 hours, which are distributed over 2–3 months.

To inform the design of an effective course, the project included a large-scale literature review on factors for effective online teacher professional development (oTPD) of digital competencies in higher education. The review identified 16 underlying factors related to the institutional, course design, and course delivery perspective (Godsk & Nielsen, 2022). In particular, three of the factors related to course design of oTPD were significant in the literature: (1) the participants' beliefs about and attitudes towards teaching and learning with technology (identified in 9 of 45 articles), (2) the support for their individual teaching development (identified in 14 of 45 articles), and (3) communities and collaborative learning (identified in 14 of 45 articles) (Godsk & Nielsen, 2022). This article briefly describes how KUBU is designed to support these factors as well as the impact of the design on the participants based on a pre/post survey with Likert scales on their view on technology, collaboration, knowledge

sharing, and change of teaching practice. 11 out of 11 participants completed the pre-survey, and 8 out of 10 completed the post-survey (one dropped out) equivalent to a response rate of 80–100%. The respondents originated from seven different programmes and six different institutions.

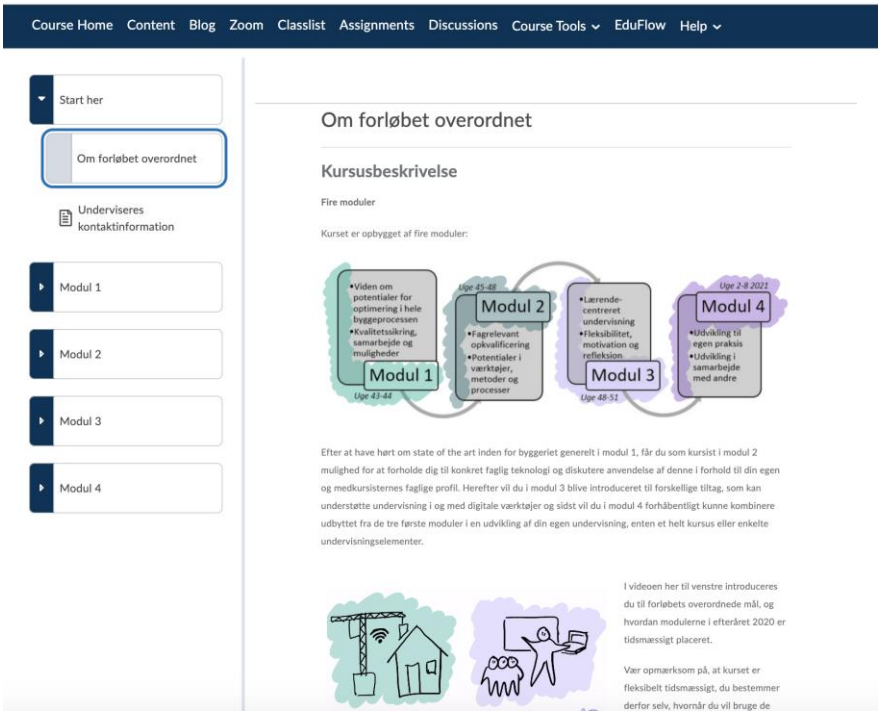


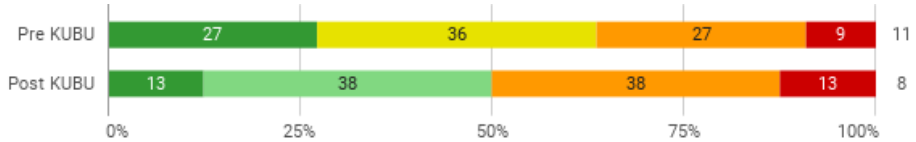
Figure 1. Screenshot of the KUBU course welcome and course description page.

Beliefs about teaching with technology

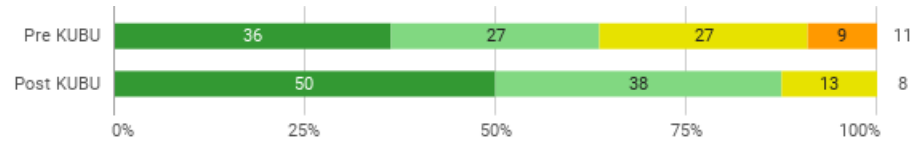
Teachers' beliefs about and attitude towards teaching and learning with technology are highlighted as essential for effective TPD initiatives on technology (Godsk & Nielsen, 2022). Thus, it is important to support a positive attitude and design for change of practice and beliefs. In the context of KUBU, this was supported by videos with experts on state-of-the-art digitisation in the building industry, trialling of new digital tools, six discussion activities, and sharing of development ideas. The participants had to describe their idea of pedagogical development and give feedback on others' ideas. The purpose of this activity was to encourage the participants to start developing and reflecting on their teaching.

The pre/post survey addressed the participants' change of beliefs using five core values from the technology acceptance model (TAM, Scherer et al., 2019): perceived usefulness (PU), ease of use of the technology (PEU), attitude (ATT), behavioural intention (BI), and actual (perceived) use (USE).

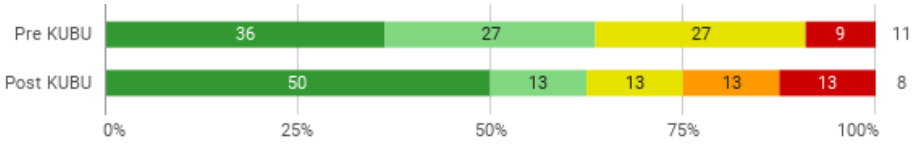
I find it easy to integrate technology into my teaching (TAM PEU)



Technology has a positive influence on students' learning (TAM PU)



My teaching improves when I use technology (TAM ATT)



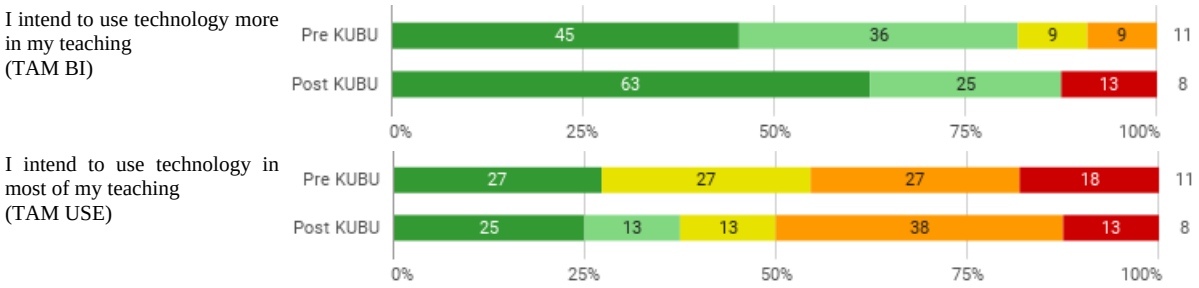


Figure 2. TAM scores pre and post KUBU.

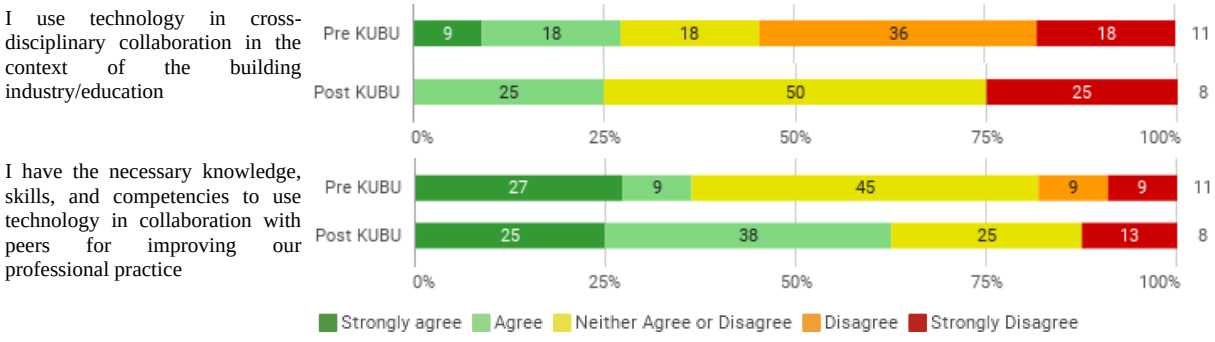
The survey revealed increased perceived usefulness (PU) and ease of use of the technology (PEU), whereas the attitude (ATT), behavioural intention (BI), and actual (perceived) use (USE) were not significantly increased (Figure 2). The TAM scores suggest that beliefs did slightly change in favour of the use of technology in teaching during the course. However, the attitude, intention, and actual use did not increase during the course, which stresses the importance of designing for a change in beliefs that may occur later — e.g., when the participants are experiencing the impact of the technology in their teaching practice.

Community and collaboration

KUBU supported community-building among the participants as well as with peers not involved in KUBU, and collaboration among the participants. Within the course, the community-building was supported through a scaffolding process inspired by Salmon's five-stage model (Salmon, 2004), where the participants start socialising and exchanging information in Module 1 and end up with constructing knowledge based on dialogue between the participants and online discussions related to their teaching practice and redesign with peer and moderator feedback in Module 3 and 4. This is not only useful to support the participants' learning process but also to demonstrate how participants can benefit from a peer community. In total 10 out of 21 activities included a peer collaboration element, ranging from one out of five activities in Module 1, two out of six activities in Module 2, three out of four activities in Module 3, to four out of six activities in Module 4. In most activities with peer collaboration, the participants were either encouraged or requested to respond to others' contributions and were free to respond to contributions from their own or another institution. However, in practice, the participants seldom responded to contributions and typically only to posts related to their institution. Whether or not the participants would build or engage in a local community after KUBU was not directly supported in the course and would depend on the individual institutions. However, KUBU explicitly encouraged the participants in the activities to contact peers for technology support, discuss ideas, and/or share their redesigned teaching in Module 4 in a Padlet so that future participants (and others) could benefit from this:

> 'To create a permanent/sustainable change of practice based on the work in Module 4, we will finish the course by you sharing your work so that others can be inspired by your efforts in the future'.

The surveys addressed the participants' community-building and collaboration using two pre/post Likert questions and two post questions on sharing outcomes (Figure 3).



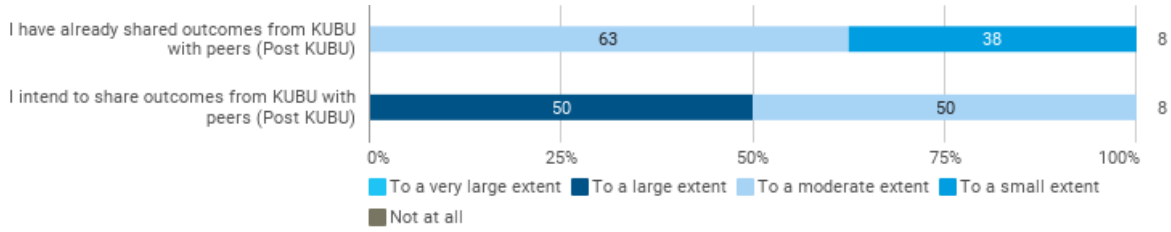


Figure 3. Collaboration and sharing scores.

The surveys show that the skills and competencies for using technology in collaboration with peers have increased. The participants have not yet significantly increased their collaborative use of technology; however, the participants have to some extent already shared and to a large extent intend to share the outcomes from KUBU with peers after the course.

Individual teaching development

An overarching purpose of KUBU and the theme in Module 4 was the participants' individual redesign/development of their teaching practice involving technology. In Module 4, the participants were asked to qualify the pedagogical ideas of the design, develop the teaching materials, document, and share the design using a template that captured the purpose, content, form, relevance, student activity, communication, supports, timeframe, and feedback aspects. Despite only two out of ten participated in the discussions and feedback activities and only one developed actual teaching materials, nine participants ended up sharing their individual redesign/teaching development after several reminders.

The post-survey confirms that KUBU did not yet result in a major redesign of the participants' teaching, but the results suggest a potential inspirational effect on ¾ of the participants' teaching form (e.g., activities, support, and use of technology) (Figure 4). The limited effect on actual teaching practice may be explained by the duration of the course (2–3 months), which makes it logistically difficult to redesign a practice within this short time frame.

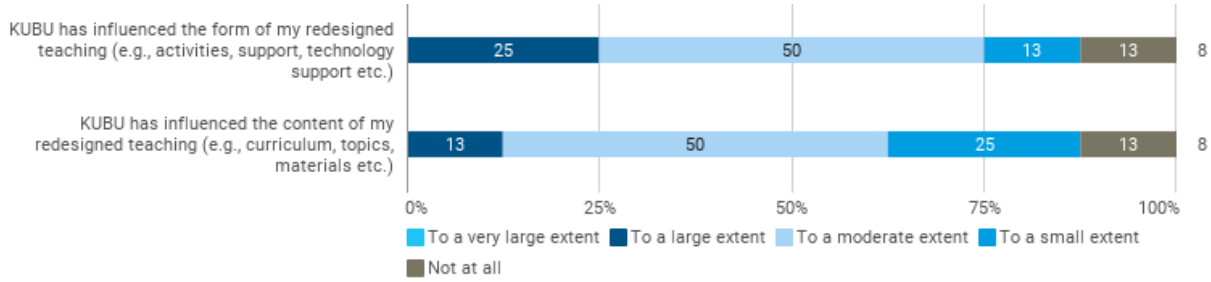


Figure 4. Influence of KUBU.

Conclusion

The KUBU pilot revealed that some aspects of the three key factors for effective oTPD were improved/changed during the course, including collaboration and technical skills and competencies, while others, such as individual teaching development and attitude towards technology, were not. That is, the results suggest that the participants obtained new technical skills and competencies useful for introducing technology in their teaching practice, but also that KUBU did not fundamentally change their beliefs about the technology in teaching and learning nor made them change their practice within the duration of the course. However, the participants did express intentions for using outcomes from KUBU in their teaching and collaboration with colleagues. Thus, it is important to follow up on the teaching development at a later time (e.g., one year later), when the participants have had the opportunity to implement their design in practice. Furthermore, it is important to acknowledge that fundamental change of beliefs may not occur before the participants experience positive effects on their teaching practice and thus not change before the teaching development is implemented (Guskey, 2002). In other words, providing a course like KUBU may result in oTPD but does not guarantee educational development and technology integration. Thus, an extended duration of KUBU, as well as a better integration with existing educational development practices, communities, and leadership at the local institutions, would benefit KUBU. In addition, KUBU itself may be fine-

tuned to better fit the needs of the participants by shifting to an easier-to-use learning platform better suited for networked learning activities such as collaboration and peer feedback.

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Hybrid learning environments: It's all about ecology

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Abstract

Technology-enhanced learning has been part of higher education health contexts for nearly three decades, but since the recent Covid-19 pandemic specific challenges emerged, requiring learning design reconfigurations to facilitate continuity of student learning. The pandemic calls for a deeper understanding of how technology can promote connections, active participation and knowledge building in higher education health contexts. Identifying what is currently occurring and considering potential innovations requires a move towards a nuanced understanding of the ecology of complex elements contributing to productive networked learning in these contexts. This multiple-case study doctoral research project includes four undergraduate health courses at a New Zealand university, in the disciplines of nursing, social work, and bioscience. Drawing on the Activity Centred Analysis and Design (ACAD) framework, the research explores the influence of course design elements, such as social arrangements, learning space formats, learning tasks, on learning activity, taking a systematic approach to the analysis. In this paper, we report on initial observations and interviews with students involved in diverse hybrid learning environments, in order to identify how innovative learning designs are supporting students' agency and active engagement.

Keywords

Multiple case study research, Higher education, Hybrid learning, Health education

Introduction

The use of technologies for teaching and learning in higher education, undergraduate health courses have existed for nearly three decades, with varying views on effectiveness. Much research highlights positive elements such as, social interactivity (Hayes and Graham, 2019), augmentation of course resources (Henderson et al., 2017), increases in learner engagement, critical and creative thinking (Santos, et al, 2019), and flexibility that considers student learning preferences (Taçgın 2020). However, other studies take a cautionary stance in relation to educator expertise (Delgaty et al., 2017), access to technology resources (Dubovi, 2018), varying learner technical and navigational skills, and issues with connectivity (Romli et al., 2020).

In health education, technology use may include presentation tools or videos, collaboration tools, the support of Learning Management Systems, but also VR/AR, hi-fidelity simulations, and many other software applications to allow students to safely practice specific healthcare procedures and processes. As such, many health courses could be described as involving hybrid learning environments, which include a network of inter-connected elements (Gil et al., 2021). Despite the consistent presence of technologies for teaching and learning in undergraduate health courses, a more nuanced understanding of how technologies might extend students' experiences across and beyond physical classrooms (Bayne, 2015; Fawns, 2019) is still needed – one that focuses on connections, active participation and knowledge building through networked learning practices (Goodyear et al, 2004; NLEC, 2020, 2021). To appreciate nuances within a networked learning environment, it is important to gain an understanding on the purposes of the learning activity, the tools that are used and the strategies that support learning.

We conducted a multiple-case study of four undergraduate health courses in a higher education institution, which includes courses in the disciplinary areas of nursing, social work, and biosciences. Course cohort sizes ranged from 8 to 175 students and incorporated a variety of social and spatial arrangements. Focusing on connections between practice-theory (Goodyear, 2020), this research examines structural aspects and student agency within emergent learning situations. This project is currently in the data collection and analysis phases of research. This paper reports on the initial findings of learning observations and interviews with students involved in these undergraduate, health courses' hybrid learning environments in order to identify key elements that contribute to innovative learning design, to support agency and active engagement.

Aims and Objectives

The aim of this doctoral research is to explore productive hybrid, undergraduate, learning environments within the health division of a higher education institution. The focus is on how innovative learning designs influences learning activities, encourages active participation, and supports learner and teacher agency. The research question and related sub-questions are:

What characterizes productive hybrid learning environments in healthcare higher education?

- How do learners and educators characterize productive learning activity within technology-mediated learning environments?
- How do learning design elements, in technology-mediated learning environments, support learners' experiences?
- What do learners identify as contributors to productive learning environments?
- What do educators and allied professional colleagues identify as contributors to productive learning environments?

This presentation reports on the third sub question, focusing on characteristics that learners identify within productive learning environments.

Design

Grounded in both networked learning (Goodyear et al, 2004; NLEC, 2020) and in practice theory (Goodyear, 2020), the project explores active engagement and agency of learners and teachers, and examines both structural aspects and student agency within learning situations. We hope this research may contribute to inform the development of innovative teaching and learning practices, learning spaces, educational policy and educational design strategies.

Analysis of the learning environments takes a systematic approach using Goodyear and Carvalho's (2014) Activity Centred Analysis and Design (ACAD) framework which brings an ecological view of learning. ACAD calls for careful attention to relations between designable elements and learning activity. There are three distinct dimensions of design (i) the set design – which is about the material and digital elements, including their spatial and temporal distribution, (ii) the social design – which is about considering the nature of social arrangements such as group formations, the assignment of roles, and the division of labour and (iii) the epistemic design – which is about considering valuable things for learners to do, ways of structuring information. The fourth dimension in the framework is not designable, it refers to co-creation and co-configuration activity, acknowledging learning as an emergent phenomenon, and the agency of learners to re-configure what has been initially proposed/designed by a teacher.

Methods

In alignment with Stake (2006), this research begins with a quintain (pronounced kwin'ton) which identifies the object, phenomenon, or condition to be studied – a target, but not a "bull's eye" (p. 6). The quintain contains sufficient breadth to maintain the focus on the key target, and yet it enables consideration of the influences around the edge, and how the periphery might contribute to the phenomenon, or the object being studied. The quintain developed for this research is shown Figure 1.

This short paper focuses specifically on the learner population context section of the quintain, examining the assemblage of set, social, epistemic design elements and the co-created activity that emerges at learn time. The goal is to identify key design elements that seem to contribute to productive learning, through the analyses of

teaching session observations, and student interviews, examining their views of learning situations and exploring how design co-evolved as they engaged in course activities.

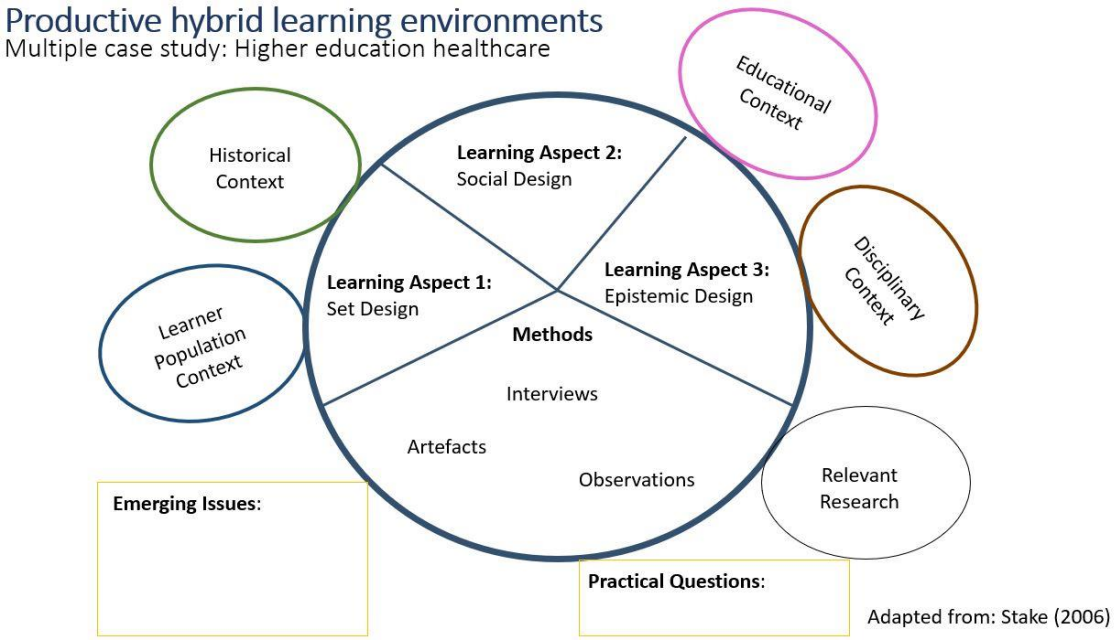

Figure 1: Research Quintain

Data collection and analysis

Individual and focus group interviews are being conducted with students in each of the four courses. Descriptive primary codes and second-level analytical codes support interpretation of the data (Tracy, 2020), in order to identify themes and correspondence within and between the cases (Stake, 2006).

Preliminary findings

Findings from the first phase of this research focused on interviews with the teacher designers in these courses and observations of course activity (Green, 2022; Green et al, forthcoming). Green (2022) discusses teachers' views on the importance of the agency of learners, creating safe learning environments, and of having an appreciation for the use of technologies for teaching and learning. Drawing on a heutagogical approach to support the development of knowledge and skills when teaching in hybrid learning environments, enables learners to select topics appropriate to their context and learning needs, complete them in a self-selected order, thereby emphasizing learners' autonomy, agency and development of capability. Green et al. (forthcoming) reveals core elements in three learning designs, which were specially crafted to honour indigenous ways of knowing and being. It discusses particular design elements and pedagogical strategies that support students to develop a deeper understanding of the influence of their wider context on learning, emphasizing decolonisation in a safe and supported learning environment. Altogether these findings support the notion of an ecology of digital and material elements, social configurations and epistemic design constantly in play within hybrid learning environments. Given the current pandemic constraints, demands for enhancing flexible delivery is constantly creating new challenges for learners, combined with the need for physical distancing to minimise virus transmission. In addition, the findings in the first phase of this research have highlighted that translation of theory into practice is predicated on creating authentic indicators of learning with relevance to students' future professional practice. This was seen in the depth of student knowledge and application of models used in practice.

In the current phase of this research, attention moves to gaining a deeper understanding of the views and experiences of learners within the hybrid learning environments that are part of this study. Preliminary findings suggest that the organisation of learning materials and resources into discrete topic modules, that can be completed at a time and order decided by the student, supports heutagogical principles of learning (Blaschke, 2012). The

influence of lecturers creating a convivial atmosphere (Green et al., 2020), and including interactive activities within live, online teaching spaces, are seen as highly conducive to moderating the restrictions imposed by Covid-19 lockdown on opportunities for co-presence interactions. The students highlighted the benefit of courses incorporating authentic, practice-based, tools, such as a web-based pharmacology resource NZ Formulary, that would later be used in placements. Pandemic-related, disruptions to learning are evident in a reduction of places to complete coursework, limitations with internet access, decreased opportunity to engage with peers increased feelings of isolation. Each of these aspects challenged student motivation for learning.

Recommendations and future research

Interviews with student participants have highlighted an ecology of aspects influencing hybrid learning environments. Of note is the importance of creating an enjoyable learning environment, such that conviviality can be experienced when both staff and students cocreate hybrid learning environments. The students raised a variety of challenges and indicate opportunities for improving learning design. Future research will investigate the perspectives and experiences of learning support staff in hybrid learning environments.

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Lifelong learning and the transformation of higher education: A preliminary framework built on networked learning experts' perceptions

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Abstract

Societal development in the 21st century has had an impact on competencies needed in working life. Such development includes a continuous professional development, and a lifelong learning process where higher education institutions are an essential partner. Contemporary lifelong learning has multiple purposes such as increased employability, organisational development, global competition, and also hopefully involves the aspect of personal development. This paper aims at reporting preliminary results focused on lifelong learning and the current transformation of higher education, posing the following research question: How can a preliminary framework for lifelong learning based on networked learning experts' perceptions of the transformation of higher education be designed? Eight experts from six different global regions, known for their research and publication records in higher education, lifelong and work-integrated learning, were invited to participate in this study, which involved multiple data collection methods. Data analysis involved staged thematic analysis with multiple coders and inter-rater verification and negotiation. The preliminary findings note the current state of the analysis based on the perceptions expressed by these experts in interviews. These findings consist of the following elements: Lifelong learning, Pedagogy, and Technology. These elements are each represented by a circle that intersects with the transformation of higher education and are seen to be surrounded and impacted by three different levels: the individual, organizational and societal levels. These levels interplay with the elements of Lifelong learning, Pedagogy, and Technology as driving forces in the transformation of higher education. How these driving forces will continue to have an impact on higher education, and how higher education steps up to take on these challenges warrant further research.

Keywords

Delphi study, higher education, lifelong learning, networked university, professional development

Introduction

Societal development in the 21st century has had an impact on competencies needed in working life. This development has included organisational as well as technological development. This ongoing development of the society have led to tight links and intersections between digital resources – such as networks, resources, systems and tools – and settings such as education, leisure and work. This development blurs the boundaries between content, place, technology, time and social settings (Jaldemark, et al., 2021). It embraces continuous professional

development, and lifelong learning processes where higher education institutions are an essential partner (e.g., Littlejohn, et al., 2019).

According to the International Commission on the Futures of Education (2021), “the right to education must assure education at all ages” (p. 24). Moreover, education at all ages also need to fulfil different purposes. Therefore, contemporary lifelong learning initiatives need to enable the fulfilment of various multiple purposes such as increased employability, organisational development, global competition, and hopefully also involves the aspect of personal development (Jaldemark, 2021). As pointed out by Billett (2010), continuous professional development with a human capital approach could better be defined as lifelong education. Compared to lifelong learning, this concept provides a holistic description of personal development with a capability approach (Boyadjieva & Ilieva-Trichkova, 2018). Billet's notion also emphasises the important role formal higher educational settings have to offer recurrent opportunities for participation in professional development. To sum up, important tasks for higher education institutions are to deliver opportunities for high quality professional development and to prepare learners for lifelong learning (e.g., Blaschke, 2021; Lock et al., 2021).

This new extended role for higher education requires rethinking including new pedagogical approaches, to support networked and technology enhanced learning (Zgaga, et al., 2019). An essential part of the rethinking of higher education should be to open up for truly work-integrated learning with flexible and personalised study schedules, where learners solve real-world problems related to their everyday lives. With the idea of a work-integrated learning, new pedagogical approaches would be needed such as technology enhancement and facilitation by qualified instructors (Gordon, 2014). This transition of higher education has already begun in many parts of the world. In the current study, this transition is explored through the perceptions of experts from different global regions. Thus, this paper presents the preliminary results from an ongoing Delphi study that have been analysed and synthesised to a framework for further development of lifelong learning.

Aims and Research Question

The paper aims at reporting preliminary results from a Delphi study focused on lifelong learning and the current transformation of higher education. These results are reported in terms of a framework that potentially could be applied by higher education institutions in lifelong learning initiatives. It answers the following research question:

How can a preliminary framework for lifelong learning based on networked learning experts' perceptions of the transformation of higher education be designed?

Methods

This study of transformation in support of lifelong learning used a Delphi Method to collect qualitative data. A Delphi method uses a series of data gathering activities to capture the perceptions of purposefully chosen experts on the topic under review. This method “has been used in an array of different contexts, where expert knowledge is needed to inform decision making or to understand a phenomenon in greater depth” (Brady, 2015, p. 2). Our data gathering techniques were desired around a system of recursive communications to create progressive interpretation via critical reflection, examination, and discussion by participants and researchers: “Delphi studies have been useful in educational settings in forming guidelines, standards, and in predicting trends” (Green, 2014, p. 1).

Eight networked learning experts from six different global regions, known for their research and publication records in higher education, lifelong, and work-integrated learning, were invited to participate in this study. Titled Linking Higher Education Transformation to Technology-Enhanced Lifelong Learning, the purpose of the study was to create a conceptual model identifying required higher education reform activity in reference to the need for lifelong learning. There were multiple collection and verification steps in the process. Participants were asked to:

1. complete an online survey,
2. read two articles, as assigned, on the subjects under investigation and as a mean to inform the subsequent data collection
3. complete an email interview,
4. verify, shape, and/or add to a data summary document, and
5. complete the process in a collaborative, group interview with other identified Delphi experts.

Data analysis involved staged thematic analysis with multiple coders and inter-rater verification and negotiation.

Preliminary Findings

The following preliminary findings note the current state of the analysis based on the interviews with the networked learning experts and the perceptions expressed by these experts. These findings consist of the following elements: Lifelong learning, Pedagogy, and Technology. These elements are each represented by a circle that intersects with the transformation of higher education. This transformation is surrounded and impacted by three different levels of human actions. These actions occur at the individual, organizational and societal levels. These different levels interplay both within and between each other. Moreover, the levels also interplay with the elements of Lifelong learning, Pedagogy, and Technology as driving forces in the transformation of higher education. The framework is illustrated in Figure 1.

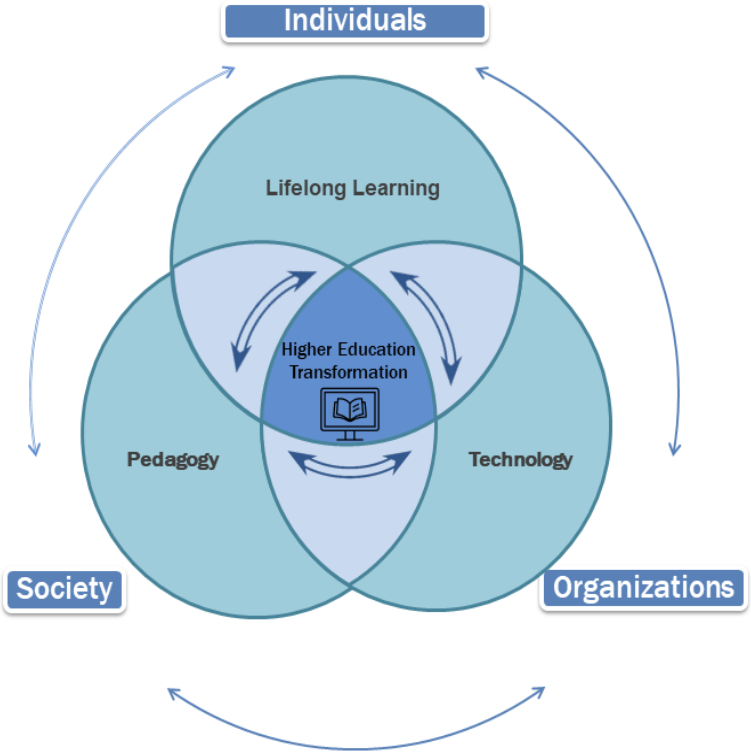

Figure 1. A preliminary framework for lifelong learning based on networked learning experts' perceptions of the transformation of higher education

The rough analysis of the data collected in the Delphi study links the relationship between higher education and Lifelong learning to several concepts which were expressed by the experts. Among these concepts, for example, the discourses of economy and employability were emphasised. Here, Lifelong learning was linked to issues of education as a means to be up to date with the needs of the labour market. Another discourse of Lifelong learning, according to the experts, linked issues such as citizenry and being an educated and erudite/literate person. In this discourse of Lifelong learning, as expressed by the experts, goes beyond employability. One example of this discourse emphasised critical thinking and that learning in itself has a value of its own. However, this learning does not necessarily have an immediate impact on economic or social issues. Several of the experts noted that this discourse of learning was related to being a citizen and building learning capacity in several aspects of life.

The element of Pedagogy in the relationship between higher education and Lifelong learning can be linked to several aspects. One aspect emphasised issues of self-direction in learning. In Lifelong learning, human beings should be able to steer and direct their own learning process. Thus, pedagogies applied should enhance self-directed learning. According to the experts in the network, this included the importance of motivation and the use of methods where learners are allowed to apply knowledge in real life situations, with a clear link between theory and practice. The element of Pedagogy also is linked to issues of inclusion and accessibility. Here the experts saw the importance of higher education institutions finding ways to include human beings from a lifelong perspective. Therefore, accessibility appears to be a key issue for Lifelong learning pedagogies.

In the relationship between Lifelong learning and higher education, Technology concerns several issues linked to affordances and the role Technology has to enhance and enable learning. As noted by the experts, in an era where digital technologies are evolving rapidly and are closely linked to many aspects of human life it is important for higher education institutions to discuss the role of Technology in education. Particularly, this discussion needs to include the link between learning and Technology. Accessibility and flexibility is also an issue which links Technology and the relationship of Lifelong learning to place and time. The potential of Lifelong learning, according to the experts was also emphasised as a link to how Technology enables learning by different combinations of place and time. This potential also concerned Technology and Lifelong learning in terms of applications/software, devices/hardware, and networks/infrastructure.

Concluding Remarks

The aim of this paper was to report the preliminary results from a Delphi study focused on lifelong learning and the current transformation of higher education. These results were reported in terms of a preliminary framework that potentially could be applied by higher education institutions in lifelong learning initiatives. The research question posed was: How can a preliminary framework for lifelong learning based on networked learning experts' perceptions of the transformation of higher education be designed?

The framework was based on the preliminary findings, noting the current state of the analysis based on the interviews with the networked learning experts. The framework represented the following elements: Lifelong learning, Pedagogy, and Technology. These elements are represented by a circle that intersects with the transformation of higher education. This transformation is surrounded and impacted by three different levels of human actions. These actions occur at the individual, organizational and societal levels. As noted by the experts in the study, the elements of Lifelong learning, Pedagogy and Technology can be seen as driving forces in the transformation of higher education. Citizenry, economy, employability, inclusion and accessibility, and self-directed learning will be important issues for lifelong learning.

The preliminary framework has been fruitful in illustrating the perceptions of the networked learning experts and presenting the driving forces for lifelong learning and the transition of higher education. Continued development of the framework may result in further insights into the elements in the framework and the driving forces within and between the elements in intersection and interplay. How these driving forces will continue to have an impact on higher education, and how higher education steps up to take on these challenges warrant further research.

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Networked aspects of lifelong work-integrated learning - the BUFFL case

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Abstract

The increasingly digitalised and continuously changing working life needs a continuous lifelong professional development that preferably is networked and work-integrated. This this study builds upon university teachers' and course participants' experiences from a technology enhanced project called BUFFL A pilot project that combines truly work-integrated learning with lifelong learning, in a strive to address the contemporary need for continuous professional development. The important aim in the BUFFL project is to develop a model for collaborative, flexible, and lifelong professional development. A new and interesting concept in the BUFFL project was to involve concept of Bringing Your Own Data for activities in course modules. The aim of this study is to describe and discuss the lifelong work-integrated learning in the BUFFL project from a networked learning perspective. Data were gathered from e-mail interviews with teachers, e-mail conversations between teachers, facilitators and course participants, and from course evaluations. Results from the data sources have been grouped into three main themes in an inductive thematic analysis. Findings show that in academia, in industry, and in the in between a potential is found in the form of collaborative learning. A networked collaboration that should involve the theories from academia, combined with real-world-problems in the workplace, to achieve a fruitful meeting between academia and the industry

Keywords

Networked learning, Lifelong learning, Work-integrated learning, Bring your own data, BYOD

Introduction

In the industry, the working-life of the professional is today characterized by continuous changes and digital embedded work conditions combined with a moving professional competence needed for handling complex business relations and tasks (Vithayaporn, 2021). A working-life that also requires the ability by both the individual worker and the company not only to identify what knowledge and competences need development, but also know how to participate in such professional development activities (Jaldemark et al., 2021). Using the words by Littlejohn et al. (2019), it is important to address that 'Once professionals have reached a particular level of expertise, they continually need to learn new concepts or develop novel forms of practice' (p. 3). In this way, networked lifelong learning becomes an always present and integrated part of a work practice situated in the knowledge society.

Acknowledging an ongoing discussion concerning the definition of the concept of networked learning (NLEC, 2021), in this paper, the concept is defined as the learning activities which connect university teachers with a learning community (Goodyear et al., 2004) and the contexts in which the involved teachers participate (Rydberg & Sinclair, 2016). This paper reports academia teachers' and course participants' experiences from an online project called BUFFL, a networked work-integrated lifelong learning project between academia and industry in Sweden. The aim with the project is to by means of collaborative, flexible, lifelong learning activities develop

professionals working in bank organizations or insurance companies. One main idea in the project is that the course participants use their own devices and bring their own data (BOYD) displaying challenges and problems experienced in their work-place. The BUFFL project and how we operationalize the concept of BOYD is described in further detail below.

Aims and research questions

The aim of this paper is to describe and discuss the lifelong work-integrated learning in the BUFFL project from a networked learning perspective. Two research questions are posed:
How do teachers and course participants describe possibilities for networked learning when academia meets the industry?
How can these possibilities create spaces for networked learning which combine theory and practice in real-world cases be understood?

The BUFFL project

The acronym BUFFL can be translated from Swedish to English as 'Industry development at bank and insurance companies through flexible lifelong learning'. The project was a pilot with three phases that partially intersected and were repeated on several occasions over two years. In summary, the BUFFL project combined work-integrated learning with lifelong learning, addressing the increasing need for continuous professional development. In the BUFFL project, professional development was designed and defined as technology enhanced online learning with a flexible integration in the employees', i.e. course participants', daily working life. This was a must, since all of the course participants worked full-time. For this reason, the courses were divided into course modules given at a lower study pace (Mozelius, Olofsson & Håkansson Lindqvist, 2021).

A fundamental concept in the BUFFL project was the less well-known interpretation Bringing Your Own Data for BYOD. Research on bringing your own data is rare, but there are a few studies that report promising results from research workshops that have tested the concept (Roos et al., 2014). In the design of teaching and learning activities that involve authentic real-world problems, it is of great importance that companies and organisations involved provide genuine data. A design rule for course design in the BUFFL project was that all of the course modules included at least one assignment related to theory in the provided literature, and at least one assignment was based on the involved companies' and organisations' own data (Jaldemark & Öhman, 2020). Two main course themes were: 'Company evaluation' and 'Customer relationship'.

Method

This study was carried out with a qualitative approach. The data were gathered from e-mail interviews, e-mails and course evaluations. Due to the pandemic the interviews were handled through asynchronous e-mail, with seven teachers in the BUFFL project as informants and who showed interest in participating. The analysed e-mails comprised communication between teachers, facilitators and project leaders in the BUFFL project. All of the course evaluations that were completed by the course participants at the end of the course were included. Results from the data sources have been grouped into themes in an inductive thematic analysis, following the six-step method described by Braun and Clarke (2006). In reflection, the findings may have been different if face-to-face interviews had been used, however, the combined data material present for the research questions posed relevant information.

Findings

With a focus on how academia meets the industry in networked continuous professional development the results from the thematic analysis have been grouped into Pedagogy, Technology and Combining theory and practice.

Academia meets the industry - Pedagogy

When industry met the academia in the BUFFL project, the course participants seemed satisfied with both the course design and the course content. In the evaluation questionnaires, the course participants described that they had appreciated the possibility to analyse and to reflect upon their own experiences from the industry in comparison to the course literature. One of the course participants noted: "I am really pleased with the course content and the way the teachers have designed the course. The theme of the course has been interesting and provided me with knowledge that I already have begun to use in my daily work". Several course participants also spoke of the course

seminars as interesting and rewarding. Some course participants complained about the scarce feedback both in formative and summative aspects. One participant expressed that “I had really wanted much more feedback on my work in order to know if I had done it correctly or not, I have never studied at university level before which makes it difficult for me”. The different opinions expressed by different course participants might be related to prerequisites and previous university studies. The same explanation might be applied to the contrast between some applicants strongly claiming that the course literature in English was challenging while the vast majority found it relevant and interesting. One participant explained: “The specialist literature was difficult, it is hard with literature in English, I had to read it several times”.

According to the teachers, opportunities for networked learning were seen in the form of mentorship in order to support course participants: “Subject-wise, I think that it [mentorship] is a good idea for participants. A mentor can be a teacher or someone who is an expert in the area in the company at hand. This way, we could achieve better continuity when the courses end. However, it is possible to reach the same effect by creating one or more networks with the course participants”. Here, mentorship could involve support for course participants as well as for teachers to collaborate in study challenges in university studies as well as expert competence in the area in focus in the industry. Another teacher sees networking, although unsure of the meaning of mentorship per se, as providing opportunities for sharing experiences in the form of mentorship: “I am not really sure what you mean by mentorship. However, a group for discussing experiences, etc. could be of help”.

Academia meets the industry - Technology

When the academia met the industry, challenges were seen. Technology failure was evident. When technology failed, it resulted in participant reactions such as: “…. it was impossible to connect to Zoom through my computer that I use in my work at the bank office”. Some course participants described problems with both connecting to video conferences and also experiences of poor sound quality. Some of the problems were related to imbalances in security levels, for example strict firewalls in the partner companies. Other participants highlighted the frustration generated by the university’s non-functional course portal. Furthermore, the initial access to the university web was problematic: “…a relatively messy process to access the web portal”. Initial login procedures did not go smoothly, and as pointed out by a participant in an email before quitting a course: "I don't understand why it is more complicated to login to a university than to my Internet bank". Even for teachers, the level of the technology provided by the university was seen as insufficient: “In my finance course, I use different virtual platforms where I do exams and assignments efficiently… Sometimes I need to develop my own homepage for creating a cloud for the course participants to be able to do a case study”. This could be said to be an imbalance in technology between industry and academia, but also within academia.

Academia meets the industry - Combining theory and practice

Also for the more specific parts of industry and academia integration, and how to combine theory and practice, answers were generally positive. One course participant had the opinion that “... the course has provided me with the facts that I before just have had a ‘feeling about’” and another mentioned that “It was interesting to build hypothetical scenarios that can be learnt from and then implemented in my ordinary workplace”. There was also an appreciation for how “the course had a clear connection to the organisation I work for” and for the BYOD concept, and to have discussions and to get feedback on “…the own data that were included in the course”. There was also a participant who pointed out that there had been “A lot of interesting things that have opened my eyes about how we should handle knowledge internally in the company, I will continue to read about subjects like core competencies and expert knowledge, I think that will help the company”. Regarding theory, one of the participants claimed that: “…some of the articles gave me important input to my understanding of central questions in relation to the continuous development of our company”. On the other hand, there were also less affirmative answers such as: "some of the articles were too theoretical and lacked contact with a basic level and for that reason didn’t contribute that much to my understanding”. Thus, the theoretical input from academia sometimes provided value-added, but was sometimes too challenging for the course participants.

Discussion

The aim of this paper was to describe and discuss the lifelong work-integrated learning in the BUFFL project from a networked learning perspective. Two research questions are posed: 1) How do teachers and course participants describe possibilities for networked learning when academia meets the industry? and 2) How can these possibilities create spaces for networked learning which combine theory and practice in real-world cases be understood?

When industry meets academia, in regard to pedagogy, both teachers and course participants see opportunities for supporting networked learning through mentorship. Mentorship provides opportunities for networked learning in groups of teachers as mentors, but also for course participants in industry. When technology is in focus, teachers and course participants see challenges in accessing technology, where challenges were seen in complicated login procedures and different levels or insufficient levels of technology. These challenges are in turn hindrances for possibilities for networked learning for participants and teachers, but also between teachers and participants which are necessary to bridge networked learning between industry and academia. Finally, combining theory and practice provide opportunities for participants to use their own data in real-case scenarios and theoretical knowledge which is relevant for theory. However, in reflection, when academia takes over and the theoretical base becomes too strong, networked learning can be said to decrease, i.e. when practice and theory are too far from each other and are not combined to support learning.

Conclusion and lessons learnt

In conclusion, the continued work in exploring how to continue to support WIL when academia meets industry can be seen in: equity, value-added and BYOD. In regard to equity, it will be important to find the balance in networks for supporting networked learning in academia and industry. How academia and industry meet in between, will need to take place on equal terms. One issue will be finding a balance between theory and practice, in which learning may be too academic for industry and too practice-based in industry for academia. For networked learning to take place, both sides must meet in the in between in order to support the contribution of networked learning. When academia meets the industry, there appears to be a value-added through networked learning. In academia, industry and in the in between a potential is found in the form of collaborative learning. Collaboration which includes the theories from academia combined with real-world-problems in industry can be seen as a fruitful source of collaboration and which joins academia and industry. Participants from a company work together with real-word problems from the workplace. Problems that are not completely solved in a course module can be passed on to participants from the same company in another course module, or to a later version of the same course module. Long-term mentorship for networking in academia and industry, may offer many different motives for networking and networked learning. Bring your own data offers possibilities for supporting teachers' and course participants' use of authentic, real-world data. From a WIL context, industry gains access to academic content and theory can be applied to create knowledge directly in practice. Here, technology which supports bring your own data will be a key factor. Technology in academia may have to step up in order to meet technology in industry for supporting networked learning for teachers and course participants. These efforts may also be important insights for redesigning in a long-term mentorship model for networked learning in academia and industry.

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Using the lens of liminality to understand important steps in creating conditions for networked learning in work-integrated learning

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Abstract

In this paper university teachers' and professionals' work in the BUFFL project, a networked work-integrated lifelong learning project with flexible online course modules. The project involved a meeting space between academia and industry bank organizations or insurance companies in Sweden. Previous research in the project reported that four important steps are important for a successful establishment of a networked community of practice and networked learning. In this paper, the concept of liminality, or a liminal space, is used to explore work-integrated learning. The short paper concludes that there is a balance to strike between the risks and possibilities of liminality in learning in practice. From the different perspectives of liminality, a balance is needed when academia and industry meet. While both academia and industry bring their formal spaces and structures, this meeting can be said to create a liminal space that provides a free and uncertain place of possibilities where learning and transformation take place.

Keywords

Communities of practice, liminality, liminal spaces, networked learning, work-place learning,

Introduction

Learning often takes place in informal and incidental places. However, learning in such places is not very well understood in existing research (Johan et al., 2019). The concept of liminality has been found useful to understand challenging situations in teaching and learning (see for example Jepson Wigg & Ehrlin, 2021). In many ways, an employee is as new to the teaching environment as for example a newly arrived student, even though they also differ in some respect. n employee is not only an individual who works, but also an individual who learns in the work place. In the workplace, professionals today meet continuous changes and digital embedded work conditions as well as the professional competence needed for handling complex business relations and tasks (Vithayaporn, 2021). Within the academic discussion concerning networked learning (NLEC, 2021), the concept is in this paper defined as the learning activities, which connect university teachers with a learning community (Goodyear et al., 2004) and the teachers who take part in this networked learning community (Ryberg & Sinclair, 2016). This paper reports university teachers' and professionals' work in bank organizations or insurance companies experiences in an online project called BUFFL. The project combines networked work-integrated learning and academic learning, in linking academia and industry in Sweden. The aim of BUFFL offer collaborative, flexible, lifelong learning activities to course participants continuous professional development at work.

In previous research in the BUFFL project four important steps were seen for creating beneficial conditions for networked learning in a project in organisations were reported (Håkansson Lindqvist, et al., 2020). Based on a combination of a literature review, and on authors' experiences of earlier networked professional learning initiatives four important steps were identified: creating a common virtual space, the handshake, the initial support and the mentorship. It is concluded that all the four described steps are important for a successful establishment of a networked community of practice (Wenger, 1998). While these steps appear to provide beneficial conditions for networked learning, they can also be said to create new possibilities for learning when academia meet the industry.

Van Gennep (1960) has discussed liminality as a form of passage, in which persons can be transformed and pass through one stage to another more uncertain stage, becoming accepted into new communities. Thus, a liminal space can be regarded to be a source of possibilities and a space for new learning. If transformation does not happen, persons may often fail to learn and to change. In this regard, very rigid structures for learning can become a problem (Bamber et al., 2017). Liminality has also been discussed as a form of danger, in which those learning can be "cast adrift" from social convention and become stuck in doubt (Horvath & Szakolczai, 2018). Cousins (2006) introduces "the idea that learners enter into a liminal state in their attempts to grasp certain concepts in their subjects presents a powerful way of remembering that learning is both affective and cognitive and that it involves identity shifts which can entail troublesome, unsafe journeys" (s. 4-5). Overall the concept of liminality can be understood as supporting the importance of the combination of different skills, the non-linearity and uncertainty of learning, learning as ritual to be accepted into a new community and liminality as a form of danger. The aim of this short paper is to explore these four identified steps for supporting networked learning using the concept of liminality.

Aims and Objectives

The aim of this short paper is to highlight the four steps identified in the BUFFL project as important for a successful establishment a networked community of practice. The research question posed is: How can these steps be understood using the concept of liminality?

Liminality in four steps of importance for implementing work-integrated learning

Four important steps were identified: creating a common virtual space, the handshake, the initial support and the mentorship (Håkansson Lindqvist, et al., 2020). It is concluded that all the four described steps are important for a successful establishment of a networked community of practice and can all be seen as liminal spaces.

The first liminal space was to create a common workplace to support networked learning in a virtual space. The teachers in the project prepared for the upstart of their courses together with university teachers as mentors. The course modules were developed in the university's virtual learning environment (VLE) with university technical support. Challenges were seen in creating new course modules, registering participants who were not students and administrators who had a lack of understanding of the overall project design and the need for flexible routines for connecting teachers and participants to the VLE.

Entry into the second liminal space the initial handshake is important. Failure in this liminal space may result in low motivation and a high dropout rate among first time adult online learners, and is therefore an important issue for teachers. For networked learning to take place, the first contact with technology supported education and VLEs as well as accessing the learning content. The handshake can alleviate frustration in dealing with both pedagogical and technical aspects in order to support networked learning. In the BUFFL project, the importance of the initial handshake was established through early in-person or virtual joint sessions to establish contacts and collaboration. In this liminal space, teachers and students for joint support.

Many of the teachers in the teacher community were new to technology-supported activities. Entering this third liminal space, initial support was very important. In the BUFFL project technical training and support for the VLE was offered the video conferencing tool Zoom through realistic training sessions carried out as Zoom sessions. Furthermore, two members of the support group arranged a face-to-face workshop with hands-on activities at one of the other participant universities for project participants without earlier experience of tools for technology enhanced learning. Initial support in the BUFFL project beyond straightforward technical instructions also involved pedagogical support, technical instructions, study guides, and examples of online assessment. Although all teachers had previous pedagogical knowledge, teaching with the help of digital technologies requires a modified instructional design and knowledge in the construction of online assignments, which differ from online assignments.

The fourth liminal space regards mentorship. The work in creating beneficial conditions for networked learning within the project group was seen as a community of practice on three levels. On the first level, creating conditions for networked learning among mentors is important to exchange, evaluate and develop the work in mentorship to support the teachers in the organizations. Secondly, how mentors through their mentorship support conditions for networked learning for teachers working on the courses as a community of practice was also vital. On the third

level, creating conditions for networked learning is also created for both mentors and teachers to share and exchange experiences and development work in the intersection between mentorship and teaching.

Discussion

The aim of this short paper was to highlight the four steps identified in the BUFFL project as important for a successful establishment a networked community of practice. The research question posed was to explore how these steps could be understood using the concept of liminality.

In regard to the importance of the combination of different skills appears to be of importance for work-integrated learning in the BUFFL project. All four steps identified in the process note the combination of different skills to succeed in a new liminal space (Van Gennep, 1960). One particular challenge discussed in existing educational research is dealing with participants who have other social spaces apart from the learning setting where they also learn (Jepson Wigg & Ehrlin, 2021). In creating a common virtual space mentors and teachers come together to exchange and combine skills in order to co-create the VLE. The handshake combines the combination administrative, pedagogical and skills, which in turn creates the condition for the pedagogical and technical support provided in the initial support. Lastly, the networked learning in the community of practice seen in the combination of fills and knowledge in the mentorship between mentors, teachers and teachers and mentors creating a new space for exchanging experiences and learning.

The challenges seen in the four steps can also be seen as representation of the non-linearity and uncertainty of learning as a troublesome journey (Cousin, 2006), when university teachers meet teachers in workplace learning, uncertainties arise. Challenges seen in university routines and structures are not always easy to manage. In all of the steps, non-linearity exists between the steps as well as within steps. One such example was seen when university administrative staff were forced to meet course participants who are not regular students or where other technical structures were needed, as well as there being an imbalance between VLEs and other technical platforms. However, these spaces of non-linearity and uncertainty also provide possibilities for mentors and teachers to mirror their own administrative, technical and pedagogical processes and routines and to learn in this liminal space.

In regard to learning as ritual to be accepted into a new community, the identified steps were seen as important in creating a new community of practice (Wenger, 1998). Although all of the steps can be said to represent learning as a ritual in a new liminal space in which academia and industry are combined, this is perhaps seen most strongly in the fourth step of mentorship. Here a liminal space can be seen in the creation of a community of practice, which supports networked learning. Here, it is important to acknowledge the formal structures, which meet in a new liminal space (Bamber, et al., 2017).

Finally, liminality may be seen as involving a form of danger (Horvath & Szakolczai, 2018). Here, learners can be "cast adrift" from social conventions and become stuck in doubt or uncertain. This is a challenge, but also a possibility in all four of the identified steps. If teachers are not able to create a common virtual learning space, there is a strong risk that the learning space is not co-created and networked learning is not supported. In the handshake and initial support combine administrative, pedagogical and skills, which in turn creates the condition for the pedagogical and technical support provided in the initial support. If the support offered is not sufficient there is a danger that teachers lose motivation and participants do not take part in courses. Lastly, the networked learning in the community of practice seen in the combination of skills and knowledge in the mentorship between mentors, teachers and teachers and mentors. If this work is not supported the possibilities which the liminal space provides may not be achieved.

Conclusions and lessons learnt

Different perspectives of liminality appear to be fruitful in exploring and understanding the support needed to attain learning in a liminal space, when studying the four important steps for supporting networked learning in work-integrated learning in the BUFFL project. These liminal spaces provide opportunities when new skills and knowledge are combined and created. From the different perspectives of liminality, a lesson learnt is that a balance is needed when academia and industry meet. While both parts bring their formal spaces and structures, this meeting can be said to create a liminal space that may provide a free and uncertain place of possibilities where learning and transformation take place.

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Agency and signification in learning with digital technologies: a theoretical approximation of actor-network theory and representational perspectives

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Abstract

This paper put an approximation of Actor-Network Theory – ANT (cf. Callon & Latour, 1981; Latour, 1988; Latour, 1993; Latour, 1994) and representational philosophies deriving from the social semiotic multimodal theories (e.g., Hodge & Kress, 1988; Kress, 2010; Kress & van Leeuwen, 2021; van Leeuwen, 2005) to the fore to conceptualize how meaning-making (known as sign-making, learning, the process of signification, Bateman, 2018; Bezemer & Kress, 2016; Kress, 2010) via technologies come about from the technologies' various prompts. It is essential to recognize how representations such as semiotic resources – here, technologies and sign systems – have agency to form social practices. They are agentively selected, interpreted, and acted upon by the user into meaning-making activities (Jewitt, 2008, 2009, 2014). The technologies' front- and back-end properties' semiotic regimes (van Leeuwen, 2005; Djonov & van Leeuwen, 2018a) in different configurations ~~can~~ function as actants by symmetrically translating interests between humans and non-humans, into hybrid existences (Callon & Latour, 1981; Latour, 1994). Humans and technical objects are not rigid and independent substances (Platonic) but beings in constant (re)associations, which modify their existence (Callon & Latour, 1981; Latour, 1994). In that sense, Callon and Latour's claims can be understood in line with the genesis and development of representations that, from a historical epistemological perspective (Wartofsky, 1979), are in constant (re)associations by technologies, cultures, social practices, and humans. As humans mediate by means of their representations (Wartofksy, 1979), the representations are re-shaping and re-shaped through the history of reproduction that impacts interaction, meditation, and meaning-making (Kress, 2010; van Leeuwen, 2005; Wartofsky, 1979). The purpose of this paper is to briefly sketch a future research aspiration striving to theoretically approximate the ANT and representational philosophies and examine what kind of agency digital technologies impose on the users and how the users draw upon that imposition in their meaning-making. Crucially, such a reflection can heighten current understandings of the intricate relationships and networks created by humans and digital technologies in contemporary learning settings such as school to better appreciate students' digital learning from a representational agency perspective integrating the "signifieds-in-transformation" and "actants." In preparation for future research studies, the following research question guides the theoretical explorations: who acts in the process of signification in learning activities with digital technologies?

Keywords

Technologies, sign systems, semiotic resources, actant, signifieds, learning, education

The Technical Agency and The Signified

Prescribing subjectivity only to humans and objectivity only to non-humans (nature and artifacts) is, according to Latour (1993), part of a modern perception of the world. One consequence of this anthropocentric perception, which makes social actions of techniques invisible, is to deceptively reduce educational learning with digital technologies to didactic activities with neutral tools obedient to human interests. Modern opinions are about the illusion that humans have control over the world, misleadingly justified in the rational exclusivity of human

existence. This illusion – the confusion of rational-human exclusivity with humanity as the only agent in the world – prevents an understanding of social existence as a hybrid translator of interests between humans and non-humans. From an ANT perspective, humans are beings whose existence takes place through the conciliation of interests with non-humans. Conciliations that are not always conscious where unconscious behaviors can reduce critical understandings of social existence.

In technical mediation, Latour (1994) emphasizes that since "the word agent in the case of non-humans is uncommon, a better term is actant, a borrowing from semiotics that describes any entity that acts in a plot until the attribution of a figurative or non-figurative role" (Latour, 1994, p. 33). In a semiotic review, Latour's (1994) interest is not to attribute human qualities to technical objects but to break the polarization between human-subjects and non-human-objects, considering that the object assumes the role of the subject when it places its interests and acts in technological mediation by translating, composing, black-boxing, and delegating. Thus, an actant puts interests and negotiates wills, interfering in social actions and determining users' ways of acting, thinking, and feeling. These actants can be approximated with the signifieds that act as prompts from a social semiotic viewpoint. Prompts produce affect and trigger various processes of signification, where meaning is anew turned into a signified emerging different meaning-making outcomes (Bateman, 2018; Kress, 2010). Examples of technological and human signifieds are the design and processes manufactured into digital technologies (Djonov & van Leeuwen, 2018b) or the modalities produced by the user in interaction (Kress, 2017). The signifieds are then constantly acting in and transformed by the re-signification processes, where humans' cognitive processes of actions and sign-making and non-human activation of representations are salient and intertwined components (Bezemer & Kress, 2016; Wartofksy, 1979). Thus, in this short paper, the representational agency is about the active process of translations and re(associations) between humans and non-humans, which compose actor-networks existences. The approximation of the ANT and representational approaches are conceptually launched in preparation for future research studies that intend to contribute to a greater understanding of how the "signified-actants" in the signification processes are working in digital education.

Multiple Passage Points

In the last decades, digital technologies have been brought into school activities as mandatory passage points (Latour, 1988) for learning. Digital technologies become naturalized based on societal and individual justifications of their capacities for promoting self-efficacy, self-regulation, metacognition, and overall enhancement of learning (Duval, Sharples & Sutherland, 2017), which risk backgrounding a recognition of how the technologies act as social determinants. The technologies' roles as actants (Latour, 1994) are in this paper linked to their semiotic regimes (Djonov & van Leeuwen, 2018a; van Leeuwen, 2005), which can mediate social practices through their capacities, functions, and designs. These components are in the front-end-back-end continuum and therefore variously aware by and available to the users. Hence, users' possibilities to manipulate and act is related to what properties are configured from the combination of semiotic resources (hardware – devices, processors, system software, accessories, software: application systems, and sign systems: different symbolic signs composing the physical and symbolic technological design features, O'Halloran & Smith, 2013; van Leeuwen & Djonov, 2013). Those properties are more or less known to the users and selected for learning purposes, but also made explicit by corporate companies' updates, prioritizations, and choices. Thus, back-end algorithms prompt certain features on the front-end that come to privilege and evolve particular learning trajectories and social practices (Djonov & van Leeuwen, 2018b; Jewitt, 2008; Moschini, 2018; Poulsen & Kvåle, 2018). There are interests in negotiation, making up associations where a "new whole" arises, more complex than the "particular whole" of the user, the technologies, and their sign systems.

From a signified-actant perspective, the differences between web browsers can be explored beyond an anthropocentric view of them as customizable tools to meet the various human interests. Browsers have interests in the back-front-end and influence the user-student subjectivation processes. From these differences, we can reflect on technical learning as social learning. The difference between internet browsers can be understood as differences between which worlds are presented to students during their online browsing, and hence, how learning about technically mediated social life is possible. For instance, browsing in Google Chrome tends to have Google sign systems presented as tools for using the internet, known as "web 2.0". Users (non-specialists in digital technologies) can create and disseminate texts, communicate, exchange files, and even make the internet space a tool for the democratization of political life (Junior, Lisbôa & Coutinho, 2011). Lower costs and social power are necessary to occupy the internet, where Google has entailed a revolution (Ibid.) in communication. Thus, Google, Microsoft, and other corporations become hegemonic on the internet as they are the leading investors and creators. On the one hand, navigation in Brave Browser offers web navigation similar to Google. On the other hand,

navigation differs significantly because Brave exposes students to the political and economic contradictions of the web 2.0. For instance, Brave blocks advertising and exempt the users from surveillance and the commercialization of personal data. Simultaneously, the Brave browser promotes various companies' propaganda generating and gain income from blockchains and other technologies that favor data transparency and security. Internet navigation with the Tor Browser exposes students to a space of political contradictions in the infrastructural, technical order. This browser invites users to structure and operate the internet with greater anonymity and less traceability decentralized from the USA. As can be seen among internet browsers, technical differences have their existence in social and political differences, which are presented to students during the use of these technologies' interfaces. In educational perspectives that value the development of human skills in digital contexts such as computational thinking and digital culture, the exposure to different web browsers favors the denaturalization of the digital world as only instrumental and a learning process that identifies and reflects on the different humans and non-humans actants' and signifieds' organization of current life. Thus, contradictions between monopolies and local economies, which underlie contemporary capitalism and citizen empowerment, structure the internet. A well-known fact is that countries and large digital technology corporations have been repeatedly requested to elucidate how their interference in social behaviors consists of what Zuboff (2015) conceptualized into surveillance capitalism. However, the alternatives, such as Brave and Tor, need to be illuminated from a critical perspective too. Educational settings that pay attention to the sociotechnical characteristics of the technologies have a broaden perception of learning improving critical education and democratic values exemplified by a theoretical association between Paulo Freire's critical pedagogy and Bruno Latour's actor-network theory (see, Schiavetto & Schnaider, 2021). Mainly, because the composition of interests into signifieds represented in specific ways on the back-front-ends become re-signified by the actants into various digital meaning-making trajectories.

Similarly to web browsers, each search engine (i.e., Google, Bing, and Duckduckgo) are ongoingly translating and composing websites for indexing, which capitalizations of user navigation are tolerated, and who participate in the construction of the sociopolitical ideas structuring the decision about indexing and, therefore, the function and visualization of the representations on the internet itself. Depending on the techno-educational contexts of each school environment, students' learning is technically and visually mediated by such and other signifieds and actants, which highlights the non-neutral character of learning assisted by digital technologies. Rigorously, there is no assistance and plain operational use, but signifieds, actants, re(associations), and re-signification continue in the users' meaning-making interpretation with technological prompts. The choices of what digital technologies to use as packages of semiotic resources then profoundly involves the acquisition of a teaching-learning context as they enact limitations or affordances for diversity in technical and semiotic mediation with impact on how cognitive processes of actions and sign-making are transacted into various meaning-making trajectories with bearing upon the subjectivation processes (Bezemer & Kress, 2016; Jewitt, 2008; van Leeuwen, 2008). Such variations emerge in particular multimodal semiotic activity systems that influence the technology users' learning development prerequisites. On the one hand, acquiring different technologies that to a certain extent provide the same experience (internet browsers – Google and Tor; operational systems, Windows and GNU/Linux; cloud computing, Microsoft and Nextcloud; e-mails, Yahoo and Protonmail; text editors, MS-Office and LibreOffice; etcetera) will eventually be considered a redundant and even a costly action for most schools. On the other hand, the technologies have different signifieds and actants and translate variant outcomes that, in the end, have consequences for learning.

The approximation of ANT and representational perspectives in this paper can assist in exposing the technologies' interests and non-neutrality in education from a detailed perspective on their capacities, functions, and designs. Furthermore, educational practices that reveal the contradictions of social existence are essential for learning, as they favor denaturalization conditions and critical skills development. As shown in the example about internet browsers, technology-mediated educational practices can create opportunities for the students to appreciate and reflect about the different signifieds and actants active in determining their actions, thoughts, and feelings.

Aim and Purpose – Study Design

The research proposal made in this short paper intends to approximate ANT and representational perspectives. The future objective is to enrich scientific analyses on the representational agency's signified-in-transformation and actants relationships. Thus, the research question that guided the work - who acts in the process of signification in learning activities with digital technologies? - is suggested for theoretical conceptualizations and philosophical examinations of the technology-user relations in a networked learning context.

In an approximation of signifieds and actants, the different processes mediated by technologies can be starting points for tracking translations and, subsequently, elaborating the socio-technical cartographies acting in learning and education. Such an analysis can enrich the understanding of technical mediation and visualization of the interests of the technique, and semiotic studies can help to understand the differences in technical forms, in the configuration of sign systems in the human-technology signification. Relations between students and browsers, operating systems, emails, text editors, microcontrollers, robotics and hardware, software, and so forth, can be investigated beyond their immediate and more common technical functions, by a theoretical-methodological relationship between signifieds and actants that helps in exposing the non-neutrality of technique and subsequently its social existence. Such conceptualizations and examinations can be helpful in scientific studies interested in how students and teachers appropriate technologies, incorporate them into educational practices, create meanings, and the manner in which the teaching-learning process solidifies ways of acting, thinking, and feeling. Furthermore, such conceptualizations and examinations can favor schools in ongoing considerations about the technologies present in education and their impact on teaching-learning, favoring students, teachers, and administrators to maintain a broader critical awareness of non-human actants. These studies can also favor the development of educational policies, as they can be valuable resources for scientists and educators in general. In conclusion, education with technologies is a matter of signified-in-transformation and actants translating interests in the creation of subjectivities. They interferes in social power relations into various meaning-making outcomes – a point of interest to the evolvement of science and education with impacts on society.

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Machine (network) learning in K-12 classrooms: Exploring the state of the actual with Actor-Network-Theory

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Abstract

In times when machine learning (ML) and other artificial intelligence (AI) technologies are expanding the role and definition of network learning in schools, this short paper reports from a practice-centred research project that explores how K-12 teachers affect and are affected by educational technologies with AI. Accelerated by the COVID-19 pandemic, data-driven and decision-making systems with ML are already entering various educational policy and practice realms, often underpinned by promises of automation and personalization. A growing number of research, drawing from the theoretical orientations and empirical approaches from Science & Technology Studies is increasingly unpacking such promises as well as addressing controversies directly related to the constitutions of ML AI in education. Still, little research explores the adoption of data-driven AI technologies in classrooms from a socio-material, networked learning stance. This short paper introduces such work (in progress) drawing on ethnographic fieldwork conducted in Sweden. Guided by the ontological and methodological approaches of *Actor-Network-Theory* (ANT), the study focuses on the *interactions* in K-12 classrooms between commercial ML technologies and teachers. Methodologically this means engaging with both human and non-human *actors* through ethnographic approaches striving for very specific descriptions of *interactions* within the *actor-network* and its enacted realities. Preliminary findings from the first of two envisaged case studies in which a ML-based teaching aid in mathematics was tried out in 22 classrooms indicate how compensatory and contradictory actions and accounts emerge within the *network* of heterogeneous *actors*. Human *actors* seem to compensate for the algorithmic actions of the specific educational technology with ML. This is however not a fait accompli but a continuous and unsettled process in the making between humans and the (non-human) technology. Preliminary results also suggest how controversies of ML algorithms in teaching aids, such as their lack of transparency and algorithmic "governance" play out in authentic learning contexts. In conclusion, the paper argues that theoretical and methodological principles of ANT grant for non-deterministic narrative of the heterogeneous nature of educational practice and have the potential to open the black-box of machine learning in the emerging networked learning settings of K-12 classrooms.

Keywords

Artificial intelligence in K-12. Machine learning. Networked learning. Automation. Actor-Network-Theory.

Research background

AI in education thrives on academic, political and commercial assertions of how machine learning (ML) in specific educational technologies can improve and personalize learning, augment and automate teaching while at the same time, transforming all dimensions of education (e.g., Luckin et al., 2016; Tuomi, 2018). Recent year's advances in ML also inspire future imaginaries of how new kinds of mathematical precision, through data analysis of educational activity, will provide "more fine-grained understandings of how learning actually happens" (Luckin et al., 2016 p. 18). Russel & Norvig (2021) describe ML as the scientific study of how computer systems can "learn" from data without being programmed in specific ways. However, ML can also be understood as intensive data processing that affects and alter the behaviour of individuals (Knox et al., 2020). Accelerated by the COVID-19 pandemic, these multifaceted technologies are already entering different realms of policy (e.g., Miao et al., 2021; WEF, 2020) and practice (e.g., Facer & Selwyn, 2021; Luckin & Cukurova, 2019). With their entrance, thousands of data points for each student are being captured within complex network learning infrastructures daily. This data is believed to reveal insights about individual students and their learning that (human) teachers are not able to see with the same accuracy (c.f. Luckin 2016; Selwyn 2019).

A growing number of recent studies drawing from the broad collections of theoretical orientations and empirical approaches from Science & Technology Studies scrutinize these AI promises by unpacking the close

connections between research, the EdTech industry and policy and point to the problematic constitutions of ML AI in education (e.g. Knox et al., 2020; Lupton & Williamson, 2017; Perrotta & Selwyn, 2019). By challenging the ideas of education technology as an a-political tool in the service of teachers, many of the findings reveal complex and situated entanglements of "configurations" between social and material *interactions* (c.f. Jones NLEC, 2021, p. 331; Perrotta & Selwyn, 2019). However, accounts from empirical research of how these ML-based educational technologies are enacted in schools are few (Castañeda & Williamson, 2021). The recent emergence of ML in educational technology together with its poorly understood socio-material implications for practice (Hrastinski et al., 2019) sketches the backdrop of this explorative, teacher-centred research project.

Aim and research questions

Guided by the ontological standpoints and methodological principles of *Actor-Network-Theory* (*ANT*) (Callon, 1984; Latour, 1999; Law & Mol, 1995), the ongoing study aims to explore how two different educational technologies with ML affect and are affected by K-12 teachers by focusing on the complex *interactions* in classrooms. Here the term *interactions* is used to describe situations where social and material entities act or enact each other (Latour, 2007). With this in mind, the following tentative research questions (RQs) have been articulated:

- RQ1. How do human and non-human *actors interact* when two different ML technologies are introduced in Swedish K-12 classrooms?
- RO2. How do the two different ML technologies affect K-12 teachers' practices?
- RQ3. Conversely, how do teachers' practices affect the two different ML technologies?

These inquiries also have the potential to deepen the understanding of how technologies with ML shape and are shaped between human and non-human *actors* in network learning (NLEC, 2021).

Tracing with Actor-Network-Theory

Developed as a materialistic movement that explained scientific and technological innovation (e.g., Callon, 1984; Latour, 1999) ANT is used as a theory and method to trace the complex *interactions* between social and material *actors* from which all scientific and technological innovation is constructed. ANT can be positioned within the ontologies of *relational materialism*, where the focus lay on the relations that produce both the material and the social (Law & Mol, 1995). From a *relational materialistic* stance educational facts and artefacts like curriculum, routines or AI technologies emerge as temporary effects from what heterogeneous *actors* do in relation to each other in an everchanging *actor-network* consisting of teachers, students, teaching aid authors, AI-policy, educational researchers but also theories of how students learn, ML algorithms, a research design, paper tests, laptop computers, classrooms, interfaces, broadband, API:s, routers, ed-tech developers and much more. From this outset, a specific ML AI educational technology is a complex and messy infinite web of code, databases, infrastructures, platforms and interfaces, new technical settings, human experts, scientific and commercial settings founded of a vast proliferation of techniques that actively set up and construct specific ways of thinking about and acting upon other *actors* (Decuypere, 2021). The way these *networks* are composed is particularly visible when things go wrong. Conversely, these inter-connections tend to be hidden when things work smoothly. Thus, an AI-based teaching aid appears successful when the *actor-network* is stabilized and durable while concealing all the complex *interactions* between heterogeneous entities that created it and continue to maintain it. Methodologically ANT means to engage with the *actors* through ethnographic descriptions of *interactions* within the *actor-network* and its enacted realities (Latour, 2007).

Design and data production

The study is based on a *multiple case study* approach (Merriam, 1998). Two case studies are planned to address the proposed research questions. The main selection criteria for each one of the cases has been to study the "state of the actual" (Selwyn, 2010), that is to explore the *interactions* between commercial ML technologies and teachers in authentic classroom contexts. The fieldwork of the first case study draws on a Swedish innovation and research project in which an ML-based teaching aid in mathematics, here referred to as the *AI system* was tried out in 22 different classrooms. During two 6 weeks long interventions, students in years 2, 5 and 8 (age 8-9, 11-12 and 14-15) exercised mental arithmetic with the *AI system*, 3 times per week, each session lasting 10 minutes. The learning content consisted of five exercise modules, developed by the teaching aid author in collaboration with the project team. To work empirically and analytically the *actor-network* was "cut" (Fenwick & Edwards, 2017) around salient *interactions* emerging between the representatives from the project team, teachers, students, and the *AI system*. Of particular importance for the ethnographic writing up were field notes from four classroom observations and seven video-recorded and transcribed interviews with teachers and members of the project team. The analysis

was made through an abductive process (Dubois & Gadde, 2002) where key events from the ethnographic fieldwork were selected to be included in the analysis as partly inductive reasoning partly sprung out from the posed research questions and selected *ANT* concepts; *actors, interactions, actor-network* and Callon's (1984) *obligatory passage point.* Thought as the narrow end of a funnel, the *obligatory passage point* is what makes *actors* converge on a certain question and can explain why "actors are obliged to remain faithful to their alliances" (ibid p.224). The set-up and data production for Case study 2 is still in progress and therefore not reported on in this paper.

Preliminary findings

Preliminary findings indicate how compensatory and contradictory actions and accounts emerge within the *network* of heterogeneous *actors* and (re)construct the technology promises of AI in education. Human *actors* (teachers, students, teaching aid authors, educators, and researchers) seem to compensate for unexpected and undesirable algorithmic decision-making(s) of the *AI system.* Fieldnotes from one of the classroom observations illustrate how these ideas are materialized in practice:

> A classroom with desks and chairs. The desks are arranged in three rows centred in front of a big whiteboard. 20 students aged 8-9, sit at their desks in pairs or groups of three, each student equipped with a laptop computer. They are exercising with the *AI system*. A teacher circulates the room, occasionally stops, and leans over some students. The *AI system* displays 64-56 on the white laptop screen of several students. The *AI system* then continues to recommend the exercises 51-42, 90-1, 22 + 17, 37 + 19 on one of the laptops. During their *interaction* with the *AI system,* some students demonstratively use their fingers to count. They seem concentrated when taping the numbers that appear in the small, coloured, empty box of the minimalistic interface. As soon as an answer has been inserted, the *AI system* displays the next exercise in the same manner. Some students work individually with the *AI system,* others consult their neighbouring peers to get the answer right. One student says "hello, this is too difficult". After 10 minutes, the teacher ends the activity, and it is time for a lunch break. The teacher later tells me that the students seem to get exercises that correspond to their abilities and thinks students are challenged in a positive way when they get difficult exercises. He adds that it would have never worked without his help or without altering the instructions prior to the exercise sessions. (Field notes, year 2)

The scene captures just a few of the many *interactions* between a group of students in second grade (8-9 years), their teachers and the *AI system*, during a math lesson. Their teacher expresses a certain conviction to the teaching aid and its ability to personalize. However, the idea of personalization does not appear as something that the *AI system* does. Rather the idea of personalization and automated teaching emerges as an effect from the entangled web of exercises, algorithms predicting and delivering the exercises, computers, desks, students trying to insert the correct answers through keyboards via specific interfaces and a supporting teacher in constant movement within a classroom space. For personalization to emerge the compensatory work of the teacher seems indispensable. Human compensatory *interactions* can also be traced in the dialogue between one of the other teachers and the researcher:

> Teacher: Sometimes it felt like the students got the same or similar exercise for a very long period, but I think it is because they were not so good at it then or that they inserted wrong answers…But above all, it was that they could not write anything in the small box, as if it froze a bit.
>
> Researcher: Mmm… and what did you do?
>
> Teacher: Eh well... then we switched to the next module, as there were different modules that you needed to complete. (...) And then this extra module came with more exercises that especially some students used. For some, it was too difficult. The problem here was that they had to write the numbers in ways that did not work…

Rather than abandoning the *AI system* the teacher persuades her students to exercise in different modules when the *AI system* stops delivering numbers. As new modules are added by the teaching aid author, she directs her students to try these out. Hesitant to whether the *AI system* is adapting to the student's ability, the teacher seems aware of which students benefit from this kind of adaptive exercising and for whom the new modules are too difficult. This suggests that in the established *actor-network* the *AI system* recruits co-workers according to its interest, as other

actors- here a teacher – are enrolled to do its work. The teacher is in fact the one constantly monitoring *interactions* between the students and the *AI system*, providing differentiated content accordingly. As for the suddenly frozen screens, an explanation later given by human *actors* from the project team relates to the decision-making actions of the *AI system.* When a student completes a task correctly at speed, the *AI system* predicts that the individual is very likely to complete the task again and will stop displaying numbers. This "algorithmic governance" together with the lack of transparency in the decision-making process suggest how controversies of ML algorithms, also reported on in other domains (e.g., Katzenbach & Ulbricht, 2019) can play out in authentic learning contexts.

Concluding remarks

Despite its limitations to one case study, the preliminary findings empirically show how ML AI in education is a complex social and material phenomenon in the making emerging from the *interactions* between heterogeneous *actors*, all with their different interests and goals (Callon, 1984). Rather than suggesting that human *actors* will always be needed to compensate for technology-enhanced learning or that teachers' tasks cannot be automated, the empirical data production indicates that these technologies are deeply relational and that the way *interactions* occur is a temporary and negotiated process. *Interactions* are not deterministic which make them well as the emerging effects unpredictable. Future ethnographically oriented research is however needed and envisaged in order broaden the understanding of how ML-based teaching aids are appropriated and constructed in Primary Education classrooms. The sensibilities of ANT grant for a holistic and non-deterministic narrative of this construction, offering methods and theoretical concepts to open up the black-box of ML in the emerging networks learning settings of K-12 classrooms.

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Variation of HE academics' experiences of designing MOOCs: a discussion through the lens of networked learning

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Abstract

There has been abundant research studying academics' conceptions of and approaches to teaching, learning and other academic related activities in higher education (HE). However, most of the research in this area is in the traditional classroom HE context and there is very limited research in online teaching and learning contexts. Furthermore, research tends to mainly focus on academics' experiences in teaching and learning in general, and there is very little research studying academics' course designs, in particular.

MOOCs (massive open online courses) originally emerged as a new online teaching form linked to connectivism and large networks of learners, which attracted a lot of interest from HE providers and researchers. Although there is plenty of research literature studying learners' MOOC experiences, there is a lack of research on academics' experiences of MOOCs. With more and more HE institutions partnering with MOOC platforms, HE academics involved in designing MOOCs are asked to follow certain procedures and prescribed formats in the designing process. There is hardly any published research on academics' experience of designing MOOCs to understand the possible variations in their understanding of and approaches to designing MOOCs and the possible links between their perceptions and networked learning theory. This research aims to fill this research gap through a phenomenographic study of the UK HE academics' experience of designing MOOCs to gain understanding of the possible variation in their perceptions and discusses links with different dimensions of networked learning. The research results could inform course designers and MOOC development stakeholders as well as provide insights to researchers in this area.

I (first author) interviewed 22 academics from different UK HE institutions who have experience of designing MOOCs. The initial data analysis based on 14 transcripts revealed 5 categories of HE academics' perceptions of designing MOOCs. This short paper presents the preliminary analysis of the first stage and discusses the results through the lens of networked learning. The next step is to continue data analysis through consulting the remaining transcripts to refine and modify the emerged categories and constitute the structural relationship between the categories to form the final outcome space.

Keywords

Networked learning, Phenomenography, MOOC, HE academic experience

Introduction

There has been abundant research studying academics' conceptions of and approaches to teaching, learning and other academic related activities in higher education (HE). However, there is very limited research in this area in the online context. Furthermore, research tends to mainly focus on academics' experiences in teaching and learning in general. There is very little research studying academics' understanding and approaches to the process of course design in particular (Ziegenfuss, 2007). MOOCs (massive open online courses) originally emerged as a new online teaching form linked to connectivism and large networks of learners (Downes, 2011), which has attracted a lot of interest from HE providers and researchers. Several researchers (Liyanagunawardena, Adams & Williams, 2013;

Veletsianos & Shepherdson, 2016) identify research gaps in MOOC contexts: although there are plenty of research studies of learners' MOOC experiences, there is a lack of research on academics' experiences in MOOC contexts. With more and more HE institutions partnering with MOOC platforms (e.g. Coursera, edX, FutureLearn, Udacity), academics involved in designing MOOCs for these platforms are asked to follow certain procedures and prescribed formats in the designing process. Some researchers argue that these MOOCs are based on a traditional university transactional pedagogical model (Siemens, 2013) which emphasises delivery of content rather than connectivism (Downes, 2011) or development of a community of networked learners engaged in conversation, i.e. networked learning (NELC, 2021).

This research takes the form of a phenomenographic study of UK HE academics' experiences of designing MOOCs to gain an understanding of the possible variations of their perceptions of and approaches to designing MOOCs. This includes considering whether their perceptions are linked to networked learning, in some way. The objectives of the research are to identify the different ways in which the research participants experience MOOC design and constitute the structural relationship between the categories to form the outcome space (conception map). In this paper the variations of conceptions revealed in the preliminary data analysis are presented and discussed with mapping to different aspects of networked learning.

Research Design

Phenomenography originated from a series of empirical studies in conceptions of teaching and learning in 1970s. Ference Marton defined phenomenography as "a research method for mapping the qualitatively different ways in which people experience, conceptualize, perceive, and understand various aspects of, and phenomena in, the world around them" (Marton, 1986, p.31). The ontological and epistemological assumptions underpinning phenomenography and its second order perspective make it distinctive from other qualitative research methodologies in studying people's experience of a given phenomenon: first, phenomenography takes a non-dualist ontological assumption (vs. cognitivism) and concerns the relations that exist between human beings and the world around them. Second, phenomenography takes second order perspectives (vs. discourse analysis, grounded theory) about people's conceptions of the world instead of making statements of the world from researcher's perspective. Third, phenomenography focuses on the variations of experience rather than the essence (common) of the experience (vs. phenomenology). Fourth, the outcome of phenomenography is a hierarchically structured and internally related (vs. content analysis) set of categories of description which represent people's different ways of conceiving a given phenomenon (e.g. in this research, designing MOOCs).

22 academics from different UK HE institutions were interviewed. They all had experience of designing MOOCs in the UK based platform FutureLearn. A purposeful sampling (Patton, 2002) strategy was used to select research participants to provide a diverse range of cases to maximise variation. The demographic distribution was:

- Academic experience: from 2 to 32 years,
- Discipline: 6 natural sciences, 6 social sciences, 5 humanities/languages, 3 computer science,
- Gender: 12 female and 8 male,
- Age range: mid-30s to late 60s,
- HE institution: 6 different HE institutions,
- MOOC designing experience: designed 1 to 12 MOOCs.

The interviews were originally planned to be face-to-face but due to the pandemic all interviews were conducted online. All the interviews were recorded and transcribed verbatim for data analysis. The data analysis in a phenomenographic study involves "an initial identification of a set of categories of description, analysis of the structural relationship between the categories independently of the transcripts, and an iteration between the transcripts and the structural relationship, until a stable set of categories is constituted" (Trigwell, 2006, p.371). Data analysis was heavily influenced by Bowden (2005) and Åkerlind (2005a): first, use original whole-of-transcript (vs. pool of excerpts/meanings) to keep analysis in context; second, balanced priority given to meaning (categories of description) and structure (relationship between categories) so these two intertwined aspects can be co-constituted adequately in the final outcome space. To deal with the issue of managing large amounts of data, Åkerlind's (2005b) strategy was used, i.e. to carry out a preliminary data analysis using a sample of 14 transcripts. The transcripts were analysed as "a whole set" at a collective level as the aim of phenomenographic study "is not to capture any particular individual's understanding, but rather to capture the range of understandings across a particular group" (Åkerlind, 2005b, pp.76).

Preliminary results and discussion

The preliminary data analysis resulted in an initial identification of a set of categories of description. Categories of description are an abstract tool used to describe understanding of the phenomenon (Dahlgren & Fallsberg, 1991), thus each of the categories represents a qualitatively different way of experiencing. The identified five categories are described and evidenced by the quotes from interview transcripts below and mapped to different dimensions of networked learning. Interviewees are identified as S01, S02 etc. to maintain confidentiality:

Category A: **Designing MOOCs is to produce a series of short, visually interesting and accessible learning materials to engage learners with different abilities.**
'Short' is considered an important feature in designing MOOC content by research participants: *"if we did make a film, it should be no more than about 10 minutes long" (S01)*; *"you have to break it down, really, to small elements …, to like five minutes, blocks of information" (S02)*. Research participants explained that this is what they were told to do: *"she would say, that's not going to work, some of these steps are too big, you need to divide them up into individual tasks" (S03)*. "Visually interesting" and "accessible" are considered as the other two most important features in designing MOOC content: *"that needed to be in short, kind of exciting, visually interesting sound bites" (S01); "the materials should be accessible, and easy for students to learn" (S06).* Some related these features, which are considered in the designing process, to the intention of "engaging learners": *"that needed to be in short, kind of exciting, visually interesting sound bites, you know, you wouldn't go on for too long ... you need to draw them in and keep them there" (S01); "I think the other thing for online learning is that, again, it's around engagement …back to what I said before about making sure things are bite size" (S06).* Some described these design considerations in a way that related to learner's online experiences and different abilities: *"learners clearly are more inclined to keep watching the videos and keep going with the course if they find it visually interesting" (S04); "[create] things to make the online experience a bit more dynamic, and exciting and interesting" (S02); "you have to make it accessible to all levels of learners and to try to make it interesting to all levels" (S05).* In general, this conception focuses on the aspect of promoting connection between a learning community (of learners with different abilities) and the learning resources they use - according to Goodyear et al.'s (2004) definition of networked learning.

Category B: Designing MOOCs is to learn new skills and experiment with a new approach to education.
Designing MOOCs is perceived as a process of professional development in this conception: "*we were really experimenting with not just kind of new content, but whole new ways of doing the content" (S04)*; *"so this just added a new layer, layer to one's general terror for a person involved in teaching" (S10)*; "*it as a new, a new, a new approach to education so which is an exciting adventure" (S16);* "*I also felt that some of these skills that are kind of required would allow me to generate some really useful teaching materials" (S21*). This conception focuses on personal development in academic practice and considers "designing MOOCs" as a chance to learn something new, which actually acknowledges that "designing MOOCs" is different from designing courses in their already familiar HE teaching and learning context. Participants described many different elements (e.g. "massive number of audience", "video-heavy", "no credit bearing" in exploring this new landscape compared with designing conventional HE courses. The experiences described in this category, to some extent, are related to what Boon and Sinclair (2012) describe as: "transformative experiences encountered by academics in adjusting to, and participating in, networked learning environments".

Category C: Designing MOOCs is to create social learning experiences and bring people together for conversation.
This conception focuses on the aspect of promoting "human/inter-personal relationships" and "collaborative engagement" in networked learning (NLEC, 2021, p. 314): *"So the idea that it's a social learning experience, and people having conversations" (S15); "they could study … in their own time, largely at their own pace, but still as part of a social group that would let them explore" (S17); "a social learning experience that enables people to learn from each other" (S19); "what I want to enable in the MOOC is what I want people to have a conversation"(S10).* Participants depict a pedagogical view of "learning through dialogue". They emphasized "social group" and "conversation" as their focal points which clearly linked to the dialogical and collaborative perspective in networked learning. It's very interesting that they didn't specify defined roles of "learners" and "tutors" as the subject of "conversation" and "social groups" but rather using "people" broadly. This word choice revealed the dimension of "informal learning" in research participants' understanding of "designing MOOCs".

Category D: Designing MOOCs is to broadcast higher education and showcase research to public.
There are two dimensions in this conception. One is the "broadcast" view which focuses on delivering content and resources globally and flexibly:*"I think that, that MOOC was, was broadcast if that's the right word" (S05); "the kind of films we ended up with on the MOOC, … the final result is really, you know, very impressive, I think it's like a TV film … to broadcast education" (S1).* The other dimension emphasizes "designing MOOCs" as a chance to take higher education (teaching and research) outside of the paywall and make it freely accessible to the public*:"we can use that support [in creating MOOCs] and kind of broadcast these ideas that we know there is a kind of public for or an appetite for" (S12); "the idea of making an open course was … really attractive. So, … it was available widely, hopefully, right across the world, and it was free"(08); "it was about showcasing research, attracting more students"(S10).*

Category E: Designing MOOCs is to use research-informed higher education to influence people, make impact on society and change the world.
This category of description focuses on the dimension of "intention" of the phenomenon*:"[MOOCs] could generally raise the level of understanding in some of these areas, society could have a more informed decision" (S08); "if I promote this idea more effectively [through MOOCs], I can change the world in a more, in a more significant way" (S08); "I believe very strongly in impact-led research … I believe very, very strongly that academics should be making an impact on society [through MOOCs]" (S17).* This conception is related to Category D, to some extent, in terms of emphasizing connections between higher education and public/society. However, this is distinctive enough as a different way of experiencing "designing MOOCs" due to its focus on the "intention" of influencing and impacting on society. It appears to be more complex, inclusive and at a high level in the conception map. This conception is somewhat in line with the suggestion of promoting networked learning applications "in broader educational, social and political movements" (NLEC, 2021, p. 317).

Conclusion and next step

This research investigated the different ways that HE academics perceive "designing MOOCs" and how the various conceptions found in this study relate to networked learning. The initial data analysis revealed five conceptions of "designing MOOCs". Each category of description is discussed and mapped to different aspects of networked learning. This preliminary analysis (Åkerlind, 2005b) shows that research participants' focal awareness of the same phenomenon (designing MOOCs) differs in various dimensions. These five different ways of experiencing designing MOOCs are related to different aspects of networked learning, e.g. connection between learning community and learning resources, social learning, human relationship, networked learning and social impact. In phenomenography, potentially, each category is part of a larger structure in which the category are related to other categories of description. It's a goal of phenomenography to discover the structural framework within which various categories of understanding exist (Marton, 1986, p.34). Therefore, the next step in the research is to constitute the structural relationship between the emerged categories to create the outcome space. Relating the categories to networked learning, to some extent, clarifies the relationship between the categories. A limitation is that this preliminary analysis is only based on 14 transcripts thus the remaining transcripts will be intensively consulted in order to refine and modify the final outcome space.

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Barriers to organisational development in higher education lifelong learning initiatives

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Abstract

From an economic human capital perspective, higher education lifelong learning initiatives should include the professional development of individuals as well as organisational development. This indicates the dissolving of boundaries between individual and organisational development and that successful professional development occurs at both individual and aggregated levels. Based on the networked mode, higher education institutions could be closely linked to their surrounding society, embracing a two-way relationship with a hybrid character, including multiple connections with branches and/or organisations. In such initiatives, formal education and informal work-related tasks are blurred and both are emphasised as equally important. In focus are collaborative features and the idea to link theoretical reasoning to authentic organisational problems. To offer higher education lifelong learning for organisational development, Mid Sweden University initiated a project called BUFFL in collaboration with eight organisations belonging to an established network of banks and insurance companies. This paper aims at reporting barriers to organisational development in higher education lifelong learning. It answers the following research question: Which barriers could be identified when implementing a hybrid and networked approach to higher education lifelong learning for organisational development? A case-study-inspired approach was conducted. In total, 328 registrations from the collaborating organisations were documented in the BUFFL courses. In addition to open-ended questions and Likert scale questions in the course evaluations, the methods also included conversations with leading representatives of the collaborating organisations. Although several barriers were highlighted in line with the innovation resistance theory, the main barrier seems to be that no organisation applied lifelong learning as a tool for strategic organisational development. The study suggests that a crucial barrier breaker to reduce or eliminate the main barrier is a course on strategically managed competence development for leading representatives of participating organisations. A combined focus on individuals and organisations could also stimulate leading representatives to take a holistic approach to the organisation's competence development. This includes increased responsibility to ensure that investments in the competence area are beneficial for the organisation. Bringing company-relevant data as input to the courses could ensure the establishment of strong links between theoretical perspectives and work-related practices.

Keywords

Barriers, higher education, hybrid, individual development, lifelong learning, organisational development, professional development

Research Context

Supporting individuals' professional development is a crucial feature of lifelong learning in higher education (Peters & Romero, 2019). However, from an economic human capital perspective, lifelong learning initiatives in the workplace context should also include organisational development (Ahlgren & Engel, 2011). This indicates that successful professional development occurs at both individual and aggregated levels. This also means that traditional boundaries between individual and organisational development dissolve (Jaldemark et al., 2019).

Based on the networked mode, higher education institutions should be closely linked to their surrounding society, embracing a two-way relationship (Nørgård et al., 2019). While applying lifelong learning initiatives, higher education institutions could form a hybrid character with multiple connections with branches and/or organisations. In such initiatives, formal education and informal work-related tasks are blurred and emphasised as equally important. In focus are collaborative features and the idea to link theoretical reasoning to authentic organisational problems.

To offer higher education lifelong learning for organisational development, a Swedish higher education institution, i.e., Mid Sweden University, initiated a project called BUFFL in collaboration with eight organisations belonging to an established network of banks and insurance companies. The Swedish acronym BUFFL can be translated to English as follows: Industry Development at Banks and Insurance Companies through Flexible Lifelong Learning (Jaldemark & Öhman, 2020).

The project, which started at the end of 2018 and lasted until the end of June 2021, emphasised the intersection of formal education and informal work-related tasks, and developed innovative and technology-enhanced learning methods in terms of short flexible courses for professionals. At the intersection of disciplinary competencies and organisational needs, this collaborative approach resulted in a number of main themes for related short, flexible courses. The courses ran in parallel with the participants' regular workload (at 20% of full-time study tempo, for a period of one month between the start and the end of the course).

The organisations were encouraged to register employees as participants, and to bring company-relevant data as input to the courses. Such a bring-your-own-data (BYOD) approach includes the idea that course participants work with challenges related to their working life context (Jaldemark & Öhman, 2020). BYOD enables linking formal education and informal work-related tasks to provide a strong link between theory and practice.

Participants were able to work in small groups with a maximum of four individuals from the same organisation with real challenges situated in their organisations. The group members could investigate and discuss a challenge that affects all or parts of the organisation, and how processes were carried out today in relation to how they could be developed in the future. These practical problems were then analysed in light of the literature as a part of the course assessment. The participating organisations and their employees were free to apply to the courses that fit their needs at individual and organisational levels.

Based on the innovation resistance theory (Ram, 1987), innovations and developments often encounter barriers on the way to being adopted. In line with Kuisma et al. (2007), the BUFFL project acknowledges barriers related to innovation inability to produce economic or performance-based benefits, and potential barriers also need to be considered regarding organisational development in a higher education lifelong learning context. To make the adoption process smoother for the participating organisations, the BUFFL project focused on barrier-breaking activities when developing the short, flexible courses.

First, ease-of-use is described as the degree of effort that an individual perceives when using a service or a technology (Davis et al., 1989). Thus, ease-of-use can also be a barrier breaker regarding organisational development in a higher education lifelong learning context. Second, usefulness is related to convenience, access, and perceived benefits (Davis et al., 1989). For example, for-profit organisations are more likely to adopt services which offer more advantages than do other alternatives. Third, social influence is described as individuals' perceptions in the decision to use a certain service or technology based on the influence of people important to the individual (Davis et al., 1989), and as the effect of the opinions of friends, relatives, and superiors on individuals' intentions (Martins et al., 2014). In the BUFFL case, social influence covers the opinions and actions of leading representatives and employees of the participating organisations, and leading representatives of the other organisations. Accordingly, cultural issues could be important barrier-breakers.

Despite the various attempts to support organisational development, innovation resistance theory suggests that barriers will still exist (Ram & Sheth, 1989). For example, security, access, and cultural issues have been highlighted in the banking context (Dimitrova et al., 2022). Security can be seen as a barrier because of the potential risk that an organisation's data could be misused when being revealed to employees of competing organisations. This will likely affect the intention to highlight challenges within the course frame. Access to relevant BYOD is related to the security aspect. However, there is also a possibility that the organisation is unable to deliver the information needed for the employees to contribute to organisational development within the frame of formal education. Another obstacle is that leading representatives are unable to support and assist the employees related to the BYOD practice. Moreover, Kuisma et al. (2007) argued that a barrier could be linked to individuals' habits and routines. In other words, cultural issues could not only be barrier-breakers, but they could also be crucial barriers in terms of resistance to change within an organisation.

To sum up, barriers may affect all kinds of organisational development. This means that hybrid and networked approaches to higher education lifelong learning initiatives as tools to support such development need to consider these barriers to enable the intended positive organisational outcomes.

Aim and Research Question

Based on the BUFFL project, this paper aims at reporting barriers to organisational development in higher education lifelong learning. It answers the following research question:

Which barriers could be identified when implementing a hybrid and networked approach to higher education lifelong learning for organisational development?

Methods

To answer the research question, a case-study-inspired approach (Yin, 2009) was conducted, and every course within the BUFFL project was evaluated. In total, there were 328 course registrations by participating employees. After each course, the participants received an email and a course evaluation form including four open-ended questions and 26 questions with a five-point Likert scale, from 1 = very poor to 5 = very good. The information in the course evaluations were the main data source. In addition, the study used information saved on the course platforms (including digital discussion fora, study guides, video lectures and information from the teachers), and conversations with leading representatives of the collaborating organisations. The data were analysed using an approach that included content analysis. Collaborating organisations were informed that research on the course development process was part of the BUFFL-project.

Preliminary Findings

The main barrier seems to be that no organisation used the courses as a tool for strategic organisational development. Several reasons could be found.

First, course participants were sent to the courses ad hoc, mostly based on the participants' own interest in reading the courses in their free time. There was a lack of well-reasoned selection processes for enrolment in the courses. In most cases, the organisations did not allow for time in their employees' work schedules for participation in the courses and for fulfilment of course assignments.

Second, there were challenges for the participating organisations in the application of the BYOD practice. One challenge was to find assignments clearly linked to organisational development. Another challenge was to find suitable data and to manage it properly according to organisational security policies, along with the fact that employees of competing organisations were included among the course participants.

Third, although recommended, no organisation encouraged their employees to continue working with the organisation's own data after the end of a specific course. Moreover, none of the organisations took the opportunity to continue working with the identified organisational challenges when the course was given the second time. The recommendation was that new participants should continue to work with the challenges that had been identified and initiated by their colleagues (i.e., employees from the same organisations that had participated when the course was given the first time).

For the higher education institution, there was a challenge to align the examination to the organisations-specific data. Participants were asked to rate how well this was done in the course evaluation form. The aggregated answers indicate that most teachers tried to align taught theories with the organisation-specific data. When answering one of the open-ended questions, a course participant explicitly mentioned that "it was valuable to compare my own workplace experience with the theories in the course". Another participant, however, stated that "there was too much focus on academic theories". Another challenge for the higher education institution was the insufficient administrative and technological support. This aggravated the enrolment process, the communication between participants on the course platforms, and the throughput in some of the courses.

Another barrier was that the course participants did not deploy the course platform to communicate. A possible explanation was the short length of the courses and the exclusion of physical meetings. The participants from various organisations had difficulties finding times and places to get to know each other. This also highlights the importance of participants from the same organisation coming together to collaborate in solving authentic organisational challenges. A main finding, therefore, is that the importance of local study groups cannot be underestimated. One participant also emphasised the positive outcome and that the "good collaboration with my course colleague resulted in the ability to bring this knowledge with us to our common, everyday work".

A strong recommendation in the same vein of supporting collaboration and group work was that the participating organisations should enrol at least two participants on a course. This recommendation is reinforced by the course evaluations, where several participants praised the importance of organisational support. However, there were also opposing opinions. In the open-ended questions, participants who were not enrolled with colleagues from their organisation claimed that they "felt lonely" and experienced "poor support from the organisation". In fact, sole participants from an organisation have a particularly high dropout rate.

Finally, the evaluation question "How did you perceive that your group work contributed to the organisation's development?" yielded varying results. This illustrates that transferring course participants' formal education and informal work-related tasks to organisational benefit is a complex task.

Discussion and Conclusion

Although there is still a belief within the BUFFL research group that higher education lifelong learning initiatives in the workplace context should include organisational development, several barriers were highlighted during the project in line with the innovation resistance theory (Ram, 1987). These barriers can be related to the participating organisations (i.e., the leading representatives of the organisations), the participating employees, and the higher education institution.

To reduce or eliminate the main barrier, i.e., the organisations' inability to use the courses as tools for organisational development, the suggested barrier-breaker is an initial short flexible course on strategically managed competence development for leading representatives of participating organisations. This was tested late in the project as a seminar series for four of the collaborating organisations. The positive outcome suggests that this course could also facilitate long-term relationships between an organisation and the higher education institution, and meet organisational needs in a sustainable, strategic way. Included in this course is charting the need for the competence development of employees in light of the benefit to the organisation. Thereafter, each employee could focus on the most relevant courses to receive personal development and at the same time contribute to the organisation's development.

A combined focus on individual and organisational levels could stimulate leading representatives to take a holistic approach to the organisation's competence supply and competence development. This includes increased responsibility for ensuring that investments in the competence area are beneficial for the organisation. Based on the networked mode, developed and maintained long-term relationships could be the basis for recurring dialogues about content and forms for investments in professional development as a tool for organisational development. The BYOD principle could further ensure the establishment of strong links between theoretical perspectives and work-related practices.

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SYMPOSIA

SYMPOSIUM 1

Doctoral education in a national network: providing an epistemic space?

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Introduction

In 2018 the Swedish National Graduate School for Digital Technologies in Education (GRADE) was initiated as a cooperative venture between six Swedish universities. In 2020, the Swedish national research school for the digitalisation of teacher education (in short called UPGRADE) was initiated. GRADE and UPGRADE aims to strengthen the expertise in these areas on a national level in Sweden and, in doing so, increase both national and international cooperation in research training activities. One of the fundamental pillars of GRADE and UPGRADE is the networked character of the doctoral studies, with joint courses provided by the participating universities and arranged using an interdisciplinary approach. The doctoral students are admitted to different disciplines, among others Applied IT, Computer science, Curriculum studies, Education, Educational Work, Informatics, Media technology, Technology and Learning, and Work Integrated Learning. This implies that several issues with a bearing on the digitalization of education, will be researched by the doctoral students from different epistemological and analytical perspectives and with different methodological approaches. At the 2020 Networked Learning Conference in Kolding, a first symposium was held where six of the doctoral students from the GRADE research school presented their work (Lindberg & Lundin, 2020). These reported on theoretical frameworks ranging from the theory of practice architectures (Kemmis et al., 2014; Mahon, Francisco, & Kemmis, 2017), basic conceptual underpinnings of behaviorism (Skinner, 1974); Actor-Network Theory (ANT) (Latour, 2005); Wenger's expanded theory of Communities of Practice; a multimodal perspective including things-to-things, things-to-human and human-to-human connections (Bonderup Dohn, Cranmer, Sime, de Laat, and Ryberg, 2018; Jones, 2015); and a focus on the technologies and their functions.

Prior research on doctoral programs (Jones, 2013) has been described using six themes: teaching, doctoral program design, writing and research, employment and career, student-supervisor relationships, and the doctoral student experience. Exploring the socialization experience of doctoral students in six disciplines at one institution, Gardner (2010) found four common themes that were recognized across boundaries. Although the disciplinary context and the culture varied, support, self-direction, ambiguity, and transition cut across. Departing from actor-network theory focusing on the role of material things in the process of becoming a doctor, Barnacle and Mewburn (2010) showed how scholarly identity is distributed and performed in both traditional and non-traditional sites of learning and how the doctoral students are part of different networks with different meanings. Felt et al. (2013) had a focus on early-stage researchers and how they manage to reconcile demands of transdisciplinarity with other normative requirements. In a follow-up study, Brodin and Avery (2020) turned to the concept of epistemic space to discuss how doctoral students experience their learning environment, distinguishing four ways: as a world of opportunities, an alien world, an avoided world, and a joint world. In this sense, an epistemic space provided room for epistemic discussions that aim to promote a wider understanding of research and science as being part of different epistemic cultures. At this symposium, we will discuss these issues as aspects of a networked learning environment.

In this symposium, there will be six doctoral student presentations, all with quite different approaches to their doctoral projects both regarding methodological issues as well as analytical and epistemological issues. In all cases presented and discussed, epistemology is upfront in the project, providing explicit possibilities to reflect different stances in relation to other doctoral projects (bear in mind that the doctoral students presenting in this symposium are five out of around thirty active doctoral students in the network), thereby allowing for in-depth discussions in the doctoral program on epistemological issues. How the epistemological assumptions each doctoral student depart

from affects issues of analysis, possible scientific realms of their projects and possible claims they may have. The core of the discussion at this symposium depart from the concept of epistemic space.

The first presenter Fabian Gunnars will address analytical issues of networked learning research related to special needs support and learning analytics research in primary education. Very brief suggestions based on political, economic and technology-developmental dimensions are provided, highlighting benefits of approaches commonly implemented in special education, such as radical behaviorist methodology.

The second presenter Jussara Reis Andersson describes and analyses how school organizers network to expand the access and use of digital technologies in the educational system. The digitalization of the educational system requires digital competence since digital technologies develop fast. It involves a holistic view and a lifelong learning perspective.

The third presenter Sara Mörtsell lays out a set of analytic challenges for doing doctoral research with Actor-Network theory (ANT) and how conventional research technologies such as computer-assisted qualitative data analysis software acts on the knowledge that is made possible. The empirical examples are pulled from online interviews in the pandemic outbreak and two ways of assembling the analytic practices of those interviews. The examples trouble the expectations of a singularised doctoral journey.

The fourth presenter Alex Örtegren discusses two conceptualisations of digital citizenship common in educational research, Ribble's nine elements and Choi's four-category model, and how these reflect digital citizenship in a postdigital era, including potential implications for teacher education. The presenter argues that critically analysing digital citizenship is important as conceptualisations informing TE may impact the preparation of future teachers to teach for digital citizenship in a postdigital era.

The fifth presenter Katarina Parfa Koskinen departs from an Indigenous research paradigm when investigating whether a relationally intertwined onto-epistemology is present in a policy document presenting knowledge claims from the Sámi parliament in Sweden regarding árbediehtu, traditional Sámi knowledge. If so, a discussion is outlined on implications for Network Learning, and especially as occurring in remote Sámi language education.

The sixth presenter, Jennie Berg, explores and reflects methodological considerations for a study of classroom practice as networked learning. The area of interest is instruction in reading children´s literature in primary school classrooms, i.e., emergent literature didactics

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Analyzing Special Needs Support through Networks and Learning Analytics in Primary Education

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Abstract

In this short paper, analytical issues of networked learning are related to special needs support and learning analytics research in primary education. Very brief suggestions for these analytical issues are discussed for the networked learning research field to continue to expand upon. In part, the discussion is intended to form the underpinnings of a work-in-progress research project with cross-disciplinary networked connections across multiple universities.

Currently, teachers are faced with an expansion of their professional role that may be too economically demanding, which may result in consequences that is not beneficial for children with special needs. Researchers that aim to study inclusive education face the challenge to represent findings in a way that does not increase workload for teachers in primary education. Any failings in this regard may strengthen the intertwining of educational results and economical interest, which to a large extent could be considered as opposed to networked learning theory, dualistically separated from pedagogical concerns.

The inclusive goal of addressing diversity for children with special needs may be promoted by providing an educational setting with networked connections that enhances variation to modes of behavior, by addressing specific and contextual strengths and challenges of students appropriately. With learning analytics, specific and contextual strengths and challenges of students might be easier to highlight with new database schemas, algorithms, and user interfaces to represent networked data. Radical behaviorist methodology may further emphasize specific contextual findings from primary education through strictly defined events of behavior, which may be of interest to the networked learning research community to further expand upon.

Thus, this paper proposes suggestions for networked learning research of primary education, with approaches commonly implemented in special education, such as radical behaviorist methodology. The suggestions are based on networked consequences from three social dimensions: political, economic, and technology-developmental.

1 The political dimension is discussed through the notion of inclusive education for children with special needs and its current state,

2 the economic dimension is discussed through the 21st century role expansion of teachers,

3 the technology-developmental dimension is discussed through learning analytic research and its connection to bodily and biological associations. This dimension is especially noteworthy, as learning analytics is currently underutilized in primary education research as opposed to common higher education research.

Keywords

Behaviorism; Connectivism; Elementary education; Evaluation methodologies; Improving classroom teaching; Inclusive education; Learning analytics; Special educational needs.

Aims and Objectives

This short paper aims to contribute to networked learning research by very brief suggestions for analytical issues. The paper suggests that networked learning research of primary education and learning analytics would benefit from approaches commonly implemented in special education, such as radical behaviorist methodology. The suggestions are intended as counter-balance to networked consequences that may oppose networked learning theory by dualistically separate pedagogical concerns from three social dimensions:

1. Political, related to inclusive education for children with special needs.
2. economical, related to the 21st century role expansion of teachers
3. technology-developmental, related to learning analytic research and its connection to bodily and biological associations.

In part, the aim is intended to form the underpinnings of a work-in-progress research project with joint networked connection to the Swedish National Graduate School for Digital Technologies in Education (GRADE). The research project could be considered as situated cross-disciplinary in an epistemic space, due to the relative but joint positions of other GRADE participants (Brodin & Avery, 2020).

Beyond Special Education: Educational Settings with Networked Connections

Organization of inclusive education on a collective level can become an ideal only withheld on policy papers, having decisions made daily with consequences in an opposite direction for children with special needs (Allodi, 2017). Despite calls for more diverse educational settings, common solutions often imply notions of customer choice that supposedly will boost educational quality (Oliveira, 2018; Uljens & Ylimaki, 2017). In such solutions, educational results and economical interest can be considered intertwined to an extent (Mølstad et al., 2018). Such intertwining may separate pedagogical and networked concerns crucial to education, as opposed to a holistic networked connection outlined in networked learning theory (Gourlay, Rodríguez-Illera, Gregori, & Bali, 2021).

Decisions made in the inclusive sense may instead focus on the characteristics and networked connections of the educational setting and the various causes it may serve to students' emotional symptoms. Naji (2014) and Assaél, et. al. (2018) claim that neuroscience today supports the view of cognitive and emotional functions as well established, with examples of causal relationships between their influences in a setting. In these instances, excluding students with certain special needs to separate classrooms may save resources but be counter-productive (Dovigo, 2017; Persson, 2007; Tesolin & Tsinakos, 2018).

Further, these influences entail the inclusion of students with special needs may go beyond matters of equity and brain development. Studies that have used complex brain scanning equipment indicate that positive emotions improve learning by helping the retention of previous developments (Olmos et al., 2017). This study may serve as an illustration of the fact that it is very difficult to separate the cause of certain special needs to either social disadvantage or brain development as these are better understood holistically through a transactional networked learning lens (Gourlay et al., 2021).

The inclusive goal of addressing diversity could be promoted by providing an educational setting with networked connections which enhances variation to modes of behavior, by addressing specific and contextual strengths and challenges of students appropriately (Hornby, 2014; Vansteenkiste et al., 2010). To this goal, primary education would benefit from research with approaches commonly implemented in special education, such as radical behaviorist methodology that emphasize specific contextual findings through strictly defined events of behavior (Gunnars, 2021).

Analytical Issues for Learning Analytics in Primary Education

Highlighting disability related support might imply a solution involving a more flexible and individualized version of the primary education classroom setting (Ferri & Ashby, 2017). However, thought-through tasks that let students participate to an increased extent may be too demanding for teachers, by expanding the role of the teacher to a facilitator in multiple networked processes simultaneously (Andreozzi & Pietrocarlo, 2017; Brokamp, 2017; Scardamalia & Bereiter, 2014). With the requirement of greater time and ability to master such flexible and dynamic educational settings, pushback have been made from both students and teacher alike (Dovigo & Rocco, 2017).

Further increases to knowledge demands have been brought about by amplified technological developments of the 21st century (Zbick et al., 2016). As a result, more domains are being intensively networked and data-led, sometimes solely based upon large-scale biometrical data with bodily and biological associations (Williamson, 2019). Learning analytics researchers approach methodologies in line with such developments that involve new database schemas, algorithms, and user interfaces to represent networked data (Buckingham Shum & Luckin, 2019). With learning analytics, specific and contextual strengths and challenges of students might be easier to highlight despite challenges large amounts of data entail.

However, common learning analytics approaches may solely depend on networked data representations from higher education digital platforms (Cukurova et al., 2020). Further, many stakeholders may expect research to be done primarily with common methodologies involving interviews, despite the clear potential for other learning analytics methodologies (Mahmoud Mai et al., 2020; Quick et al., 2020). As outlined in a large-scale literature review, this presents a clear gap in research of primary education that may be solved by a greater amount of learning analytics studies with approaches similar to radical behaviorist methodology (Gunnars, 2021). Networked learning research could with its clear holistic emphasis to joint networked research connections be highly suitable in providing the valuable nuance necessary to examine the findings of studies with such approaches.

Conclusions with Implications for Analytical Issues of Further Research

Any failings to alleviate issues in a networked and holistic manner may according to networked learning theory further strengthen dualistic findings, such as an intertwining of educational results and economical interest, separated from transactional networked learning research (Gourlay m.fl., 2021; Mølstad, Petterson, & Prøitz, 2018). This may result in pedagogical consequences that is not beneficial for children with special needs. The presented suggestions of this paper and their relation to current literature gaps for analytical issues of networked learning can be summarized through two conclusions with implications for further networked learning research:

- Radical behaviorist methodology benefit current research in primary education for special needs support
- Learning analytics research is currently highly relevant for networked analysis of primary education

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Networking between school organizers - supporting the advanced use of digital technologies in the educational system

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Abstract

This paper aims to describe and analyse how school organizers network to expand the access and use of digital technologies in the educational system. The digitalization of the educational system requires digital competence since digital technologies develop fast. It involves a holistic view and a lifelong learning perspective. Change processes that digitalization brings make school organizers network and share challenges and successes. The data have been collected in the framework of a project between three municipalities. Thematic analysis and practice architecture have been used to categorize and analyse the data. When school organizers describe and analyse the network to expand digital technologies in the educational system, they talk about the importance of learning from each other and spreading knowledge, keeping updated with new digital technologies, thinking from a holistic perspective, and communicating digitalization plans. They also discuss the importance of support and collaboration between technology administration and schools.

Keywords

Digital competence, digital technologies, educational system, network, school organizers.

Introduction

This paper is about networking between school organizers to implement digital technologies in the educational system. The concept of networked learning includes interactions between people, technologies as artefacts, and collaboration enabling a shared culture. It can be defined as "processes of collaborative, cooperative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (Networked Learning Editorial Collective, 2020).

Networks may be important in the context of education since education is vital as a motor in societies (Carvalho & Goodyear, 2018). The researchers explain that "education can be broadly considered to include formal and informal learning, and life-long as well as life-wide learning" (p. 28). In this paper, education in the educational system refers to formal learning in pre-schools, compulsory schools, and upper secondary schools. In the last years, digital technologies have spread in the educational system, affecting teaching and students' results. Expanding the access and use of digital technologies creates changes requiring management. According to Littlejohn et al. (2019), changes' challenges may need specialist knowledge. It leads to consequences for organizations, as "professionals become more specialized" and "individual specialists need to collaborate together to solve problems" (p. 1).

In Sweden, three municipalities and Mid Sweden University participated in a network to implement the latest government's digitalization strategy. The network called Digitalization of the educational system in municipalities, abbreviated by the DUVKOM (in Sweden Digitalisering av UtbildningsVäsendet i KOMmunerna), was a project initiated by the university and municipalities aimed to study the change process to expand access and use of digital technologies in the educational system. In this network, the school organizers' representatives exchange knowledge and experiences about organizing digital technologies and digital competence in their schools.

Background

The implementation of digital technologies in the educational system has increased worldwide. Digitalization is about changing working methods and processes to increase teaching quality in schools. Organizing digital

technologies in the educational system entails challenges that require infrastructures, and there is the need for organizational knowledge (Somekh, 2008). Ottestad (2008) means that organizational knowledge and digital technologies in schools are interconnected at different levels in the educational system, and it requires dialog between individuals and groups that share the same interest. Vanderlinde and van Braak (2010) discuss schools' capacity to "foster effective change through digital technology" (p. 542) and point out the importance of support. It is a question of managing the change that enables educators to support students in their knowledge development and, in this way, to increase results in schools (Agélii Genlott, 2020). According to Bottino (2020), the problem is the quality of using and integrating digital technologies in teaching. The researcher means that it is not just an issue of digital technologies being used but also how digital technologies are used in teaching practice. Pettersson (2021) points out that digitalization processes are "limited to implementation of digital technologies without pedagogical and organizational change" (p. 187). Agélii Genlott (2020) argues that digital technologies are developed rapidly, and this leads to changes in teaching and learning, making a need for "well-grounded incentives for the use of digital technologies in daily practice, improved digital competencies, positive social systems and networks and a supportive organization promoting long-term improvement" (p. 17). Digital technologies in the educational system are connected to many reforms, which have become a political issue (Gu & Lindberg, 2021). At the same time, the researchers point out that schools are vital in societies, giving "everyone an equal education and achieving equality" (p. 224). A reason for school organizers and school leaders to understand what digitalization of the educational system means, how it may develop and why it is important. The ability to organize and lead digital technologies strategy in schools requires digital competence, which seems to be "a key factor" (Håkansson Lindqvist & Pettersson, 2019, p. 219).

School organizers are responsible for working with the needs and prerequisites of schools, creating possibilities for school leaders and educators to expand the access and use of digital technologies in schools. In addition, school organizers can increase knowledge about implementing digital technologies in schools by co-operating with each other in a network. Littlejohn et al. (2019) stress that "to solve global challenges and generate innovative solutions, professionals have to expand their knowledge through continual learning aligned with work practice" (p. 3), which school organizers can do by sharing their knowledge and experiences with each other. However, how school organizers plan and execute the expansion and the use of digital technologies in schools from a municipality perspective requires both organization and digital competencies. The availability, accessibility, and quality of digital technologies influence how digital technologies are used in learning and teaching (OECD, 2018), affecting students' outcomes and inequality inside and between schools in a municipality (Bulman & Fairlie, 2016). School organizers need to understand how digital technologies influence people's lives and society. Organizing digital technologies in the educational system requires digital competence. There are two aspects to expanding the access and use of digital technologies in the educational system: the deployment of digital technologies "to improve and extend education and training" (European Commission, 2020, p. 2) and digital competence as a citizen in society. Gu and Lindberg (2021) point out that the latest Swedish digitalization strategy aims to increase the importance of using digital technologies to gain knowledge and achieve equality. However, new digital technologies are fast, digital competence may be seen as a condition for lifelong learning. Jaldemark (2021) describes lifelong learning as "a boundless holistic phenomenon" (p. 29) of learning processes in people's private and public life.

Digital technologies in schools demand or challenge the educational system (Salavati, 2016). It requires understanding how to expand the access and use of digital technologies, how digital competence can be organized in the educational system, how they may be used, and their effects on learning and teaching. Studying networks between school organizers may lead to a model for implementing digital technologies in the educational system and contribute to knowledge transfer between municipalities, enabling the expansion of digital technologies in schools.

Aim and research question

This paper aims to describe and analyse how school organizers network to expand the access and use of digital technologies in the educational system.

RQ1: How do school organizers network to expand the access and use of digital technologies in schools?

RQ2: What enables and limits school organizers' networked expansion of the access and use of digital technologies in schools?

Method

In this study, the data were collected in the framework of the project DUVKOM, a co-operation project between Mid Sweden University and three municipalities in Sweden. School organizers' representatives for these municipalities participated in eight meetings, about three hours each meeting, during November 2018 and September 2021. The central theme for the meetings was the implementation of digital technologies in schools. A host municipality received the others in the project for each meeting and presented its digitalization work in detail. The structure of the meetings was as follows: (1) an introduction and a presentation of the participants, (2) the host municipality presented a development work connected to their digitalization work, (3) the doctoral students' current research status, and presentation of new research connected to digitalization in education, (4) the three municipalities' status and experiences regarding digitalization in schools, (5) other issues, and next meeting. Four meetings were conducted via video conferencing service Zoom due to the pandemic. This paper defines the three municipalities as AM, BM, and CM. The meetings involved school organizers' representatives for the municipalities, plus three doctoral students and an associate professor representative for the university. The doctoral students' participation in the meetings consisted of reporting the status of their research and questions to the school organizers' representatives. The questions were sent to the school organizers' representative one week before the meeting. The number of representatives for each municipality varied between meetings. For each meeting, between eight to twelve individuals have participated. Sometimes a municipality had one representative in a meeting and three representatives at the next meeting. In total, 291 pages of transcriptions, meeting protocols, and notes have been analysed.

Thematic analysis (Braun & Clarke, 2020) has been used in this paper to categorize the data. Three predefined categories have been used: Network as a platform, Digital competence for everyone, and Equal access and use of digital technologies. The data have been coded, sorted, and classified from what school organizers say about the network as a platform to share knowledge and experiences, how they work to increase digital competence in the chain of command, and how they work to expand the access and use of digital technologies in schools. According to Braun and Clarke (2020), thematic analysis "can be undertaken with quite different guiding theories" (p. 331). The practice architecture (Kemmis et al., 2014) has been used to analyse the school organizers' work to expand the access and use of digital technologies in the educational system based on what they say in the network's meetings. Mahon, Francisco, and Kemmis (2016) mean that the language used in a practice's cultural-discursive arrangement enables and constrains what people think, say, and mean in semantic space. Therefore, the theory places school organizers' sayings in focus.

Findings

The findings presented below show how the school organizers network and what enables and limits this network to expand the access and use of digital technologies in schools. The first research question is: How do school organizers network to expand the access and use of digital technologies in schools? The following text presents important keys that school organizers have identified.

Learning from each other

The municipalities were active in the network by presenting their digitalization work and sharing their knowledge, experiences, methods, and examples. In an AM presentation, the school organizer presented two different perspectives to work with the implementation of digital technologies. One perspective was connected to the school organizer's quality work "the strategic level, i.e., the school organizer level, how we try to reason and think about digitalization" (AM, 7 December 2020). The other perspective was on the school level, "it is more about what may be found at the activity or unit level" (AM, 7 December 2020). The municipalities also shared models that they used in their quality work. Sharing culture was one key for digitalization work between and in municipalities, "we have received tips and ideas from other municipalities, and taken advantage of what we have identified as success factors" (CM, 3 September 2021). Therefore, a network with a sharing culture may be an important part of a municipality's digitalization work. CM meant that "it is easy to become home blind, so these types of networks, where we can spread good ideas and maybe twist the things that can work for us, are good" (7 December 2020). The network was also a way to learn from each other and keep updated with new digital technologies, methods, and models for implementing digital technologies in the educational system, which is important since the development of digital technologies goes fast.

Holistic perspective

The school organizers discussed the importance of a holistic perspective connected to digital competence. Not only for educators "but also for school leaders and those who lead the digitalization" (CM, 28 April 2021). AM also talked about the importance of the holistic perspective, "in practice, we need to see that all our schools, with different needs and conditions, are part of the whole school activity" (AM, 7 December 2020). At the same time, AM pointed out that it was difficult to set aside time for digital competence, which affected the holistic perspective that school organizers and school leaders needed to digitalize the educational system. The school organizers pointed out that even if there was a lack of time and engagement in digital technologies' issues, there was a need to "compensate for your shortcomings" (AM, 7 December 2020) and to realize "the need to understand your shortcomings of knowledge and competence" (AM, 7 December 2020). Furthermore, a holistic perspective gave "equality information" (CM, 28 April 2021), increasing possibilities for equality in municipalities. With a holistic perspective, the school organizers made visible every activity's needs and conditions, thereby "a focus on who we exist for" (AM, 7 December 2020).

Leadership

Implementing digital technologies in schools requires leadership since school organizers may understand the digitalization process differently, and it may influence the understanding of how it changes working methods. Furthermore, the digitalization process required leadership since "leadership that does not really have all the understanding of the parts that digital technologies bring influences the equality that school organizers hope for" (BM, 17 February 2021). BM meant that a school organizer without an understanding of the possibilities of digitalization may lead to equality not being achieved. It was also important with "a common view on how the digitalization work should be conducted" (AM, 7 December 2020), which was a leadership issue.

Concepts

AM pointed out the importance of "having a common language" (25 October 2019), which the municipality estimated has increased with the help of educational initiatives. Even having a consensus of concepts was important. Using a concept in different understanding may influence how a system uses or how educators formulate students' needs, prerequisites, and progress. Conversely, not having a consensus of concepts may affect students in different ways, even when students move from one municipality to another. AM (17 February 2021) pointed out that "it is important to have a consensus of the concepts because it makes big differences in how the system is used." For example, to have the same understanding of a concept was about digital competence and digital technologies.

Digital competence

Digital competence was needed throughout the chain of command. However, digital competence should be adapted to the target group. To CM, digital competence for school organizers was "understanding for what digital technology is, and how school leaders and educators experience digital technologies" (3 September 2021). CM meant that digital competence should be adapted to the profession, leading to different digital competence needs. AM agreed with CM and meant that digital competence is "to understand others' opportunities and needs" (3 September 2021). At the same time, CM pointed out that it is an issue of understanding how it would be for others and understanding the possibilities digital technologies may lead in teaching, "it needs to be more precise and understand a certain type of digital technologies to see opportunities" (3 September 2021). AM wanted to create and increase equality between pre-schools and schools in terms of digital competence, access to digital technologies, and commitment to using digital technologies. They meant that educators also pushed for equality issues, both when it came to digital competence and access to digital technologies between schools. However, it may be inequality, "depending on the schools focus or what they buy-in and so on" (AM, 3 September 2021).

Digital technologies

AM (7 December 2020) mapped where their schools were in the digitalization work. It aimed to get a holistic view of what was happening in practice. BM meant that the access and use of digital technologies in schools were inequality since it was a school leader's issue in the municipality and not a school organizer's issue, making digitalization issues "end up to the side" (BM, 17 February 2021). CM (28 April 2021) stressed that they collaborated with technology administration in order to focus on the pedagogical perspective; schools should be able to decide on digital technologies depending on their conditions. CM also pointed out that school leaders' leadership influenced how digitalization technologies were implemented in schools. If the school leader managed

digitalization work as an important work and invested in it, then the school had come further than other schools. Regarding digital technologies in the classroom, CM pointed out that digital technologies should be easy to use in the classroom, and support was important. Expanding the access and use of digital technologies in the education system takes time; it does not happen from one day to another. The school organizer's digitalization work must not be complicated and must be communicated as easily as possible. The school organizers meant that digitalization is about “bringing a new dimension into the school,” as a “different way of doing things” and “a tool for doing things in a different way” (CM, 28 April 2021).

Equality

Equality has been an important starting point in AM:s, BM:s, and CM:s digitalization work. Expanding of digital technologies in schools has been seen as an opportunity to increase equality in and between schools, "digitalization affects students' opportunities to express themselves and the opportunity to absorb knowledge in a way" (AM, 28 April 2021). AM also pointed out that "there is an equality problem, from digital competence and access to digital technologies in the schools, so we work towards a greater equality between the municipality's schools" (3 September 2020). According to BM, equality issues may be influenced by the school organizer's and school leader's leadership, thereby influencing "students' results" (BM, 17 February 2021). In CM, equality issues have been a basis for digitalization work. CM meant that there was no infrastructure to maintain a digital quality network, "it was swaying, there was no good support or routines for how digital technologies would be maintained" (28 April 2021), affecting school leaders' motivation to drive digitalization's issue. At the same time, CM pointed out that there was a risk for "things becoming too equality" (28 April 2021), meaning that there was a risk for digitalization work becoming centrally controlled and the schools' needs invisible. CM meant that equality is not the same as doing exactly the same thing, why a balance is important, "you have to go back and listen to the activities" (CM, 28 April 2021).

Table 1 presents a summary of these keys. The themes are in the first row, and the sub-themes are under the themes in the second row. The left column of table 1 relates to the first research question, RQ1.

	The network as a platform	**Digital competence for everyone**	**Equal access and use of digital technologies**
School organizers network to expand the access and use of digital technologies in the educational system.	- A sharing culture - Learning from each other - Increase digital competence - A way to keep updated with methods and models - Spreading knowledge and good examples	- Holistic perspective by understanding the effect of digitalization in society - Digital competence influences leadership - Understanding of concepts affects equality - Digital competence to create prerequisites for teaching and learning. Understanding how other people became influenced by digital technologies.	- Holistic perspective - Learning from each other - Leadership influences how digital technologies have been implemented in schools - Understanding of concepts influences how digital technologies are used - Digital competence for understanding how to organize digital technologies in schools

Table 1: Themes and sub-themes for RQ1

The second research question is: What enables and limits school organizers' networked expansion of the access and use of digital technologies in schools? As for the first research question, the following text answers the second question.

Enables

The network allowed openness between school organizers by having dialogues about success and failure regarding expanding the access and use of digital technologies in schools. Another key was sharing knowledge, experiences, and good examples with each other. The school organizers got tips and ideas that they could use in their digitalization work, "there are many examples to learn what has gone well and what has gone less well" (CM, 20 December 2020) in other municipalities. Regarding the discussion about what allowed expanding the access and use of digital technologies in schools, CM meant that it was important to listen to the needs of the schools and sometimes take a step back, to use a checklist for the lowest level as a way to increase educators' digital

competence, what "everyone should know" (AM, 7 December 2020). One way to create equality in and between schools was to find a minimum common denominator that raised with time and had mandatory elements for everyone and involved educators in the digitalization work. However, it was important to match digital competence to the group's or individual's needs. The digitalization work at the school organizers' level has been focused on "leadership" (AM, 15 Mars 2019) and "management and control" (BM, 15 Mars 2019), which is a prerequisite for the digitalization work. Clarity on what was expected made it easy for school leaders and educators to expand the access and use of digital technologies. However, it required a clear strategy with goal orientation.

Limits

Some limitations were found in the school organizers' network. For example, when a municipality's organization was changed, and the municipal school organizer's representatives were changed, then the project's continuity was influenced. When the school organizer's representatives did not have time to participate in the network and contribute with knowledge and experiences. Regarding the discussion about what allowed expanding the access and use of digital technologies in schools, AM meant that if the school leader did not have time to work with digitalization, then he needed to compensate and understand what needed to be compensated, "need to understand your shortcomings of knowledge and competence" (AM, 7 December 2020). Digital technologies would be easy to use in the classroom, and support was important. However, lack of support made educators avoid using digital technologies in teaching. Expanding the access and use of digital technologies in the education system takes time; it does not happen from one day to another. The collaboration between technology administration and schools can sometimes be challenging. A good relationship between school organizers and technology administration maybe lead to a focus on the pedagogical perspective.

Table 2 is connected to RQ2 and presents a summary of enablers and limitations.

	The network as a platform	**Digital competence for everyone**	**Equal access and use of digital technologies**
School organizers network - enablers	- Openness between school organizers, - Share tips and ideas - Dialogue about success and failure regarding digitalization	- Open dialogue to understand the lack of digital competence - A minimum requirement - Be precise, kind digital competence	- Good relation - Good leadership - Listen to the schools - A gold thread in digitalization work - Clarity on what is expected - A good infrastructure - A holistic perspective
School organizers network - limitations	- Change in the municipality's representative - Lack of continuity in digitalization work - Lack of time	- Lack of time - Lack of resources - Individual attitude to digital technology	- Relation with the technology department - Lack of resources - When the technology is in focus for the implementation work - Lack of support

Table 2: Themes and sub-themes for RQ2

Discussion

The reality for the three municipalities is different depending on the municipality's size, economy, and culture. However, networking with each other is a way to exchange and increase knowledge about how the municipalities should be able to implement digital technologies and digital competence in schools, avoiding some challenges and creating awareness of successful keys. The findings show that by sharing knowledge and experiences about digitalization work, the school organizers increase their digital competence, understanding what was worked, and different challenges that other municipalities have with expanding the access and use of digital technologies in their schools.

Implementing digital technologies in the educational system requires a culture change in schools. However, it does not mean that there will be an improvement in teaching and an increased quality in the school. Nor does it have to mean that students' results increase. Many circumstances affect how digital technologies are used in schools, for

example, educators' and school leaders' digital competence, number of computers and tablets in school, time given for development, Wifi, infrastructure, educators' and school leaders' attitude to digital technologies. Large municipalities have more opportunities for internal networks creating a collegial learning structure and elevating employees with cutting-edge expertise in the municipality. Continuing education in the form of collegial learning is something that research recommends. The three municipalities' network is a way for the school organizers to cooperate regarding expanding the access and use of digital technologies in the educational system, which according to Littlejohn et al. (2019), is important in work practice. When school organizers discuss the importance of leadership, they point out how it influences schools' possibilities to expand the access and use of digital technologies in the educational system. According to the school organizers, it is important to understand how digitalization affects society, which is a digital competence issue. Supporting schools (Vanderlinde & van Braak, 2010) requires leadership that enables prerequisites for digitalization work. Digital competencies are ongoing on school levels, and school organizers often do not have an overview of which interventions occur and where these interventions lead to. The lack of a holistic perspective makes it difficult to measure the effect of these efforts at the principal level, which would have been an excellent strategic tool for change and development of digitalization work. A lifelong learning perspective contributes to increasing the school organizers' holistic view on digitalization work. Digitalization is a social transformation that affects the way of living as human beings. It also affects the school's role in society, becomes a tool for society as a change force, and increases equality, according to Gu and Lindberg (2021).

There is openness around digitalization issues among the three municipalities. Both in the form of a willingness to share their experiences and a curiosity about how the other municipalities have done. The relationship between school organizers and technology administration has changed to a more relationship-oriented relationship in the last few years. For example, when digital technologies are applied in schools, then school organizers and technology administration discuss both the pedagogical and technological points of view. It is a prerequisite for digitalization work not to be without the pedagogical perspective (Pettersson, 2021).

The smaller the municipality, the easier the collaboration between the school organizers, school leaders, technology administration, and IT strategies, and the easier it is to organize the digitalization work. A key to the access and use of digital technologies in schools is how it is organized, which requires leadership and digital competence, according to Håkansson Lindqvist and Pettersson (2019). It is easier for the school organizer to point in one direction and involve staff in a small municipality. However, there is not the only way to digitalize schools. There is no right or wrong, there are different ways to proceed, and the school organizers need to choose a way to work with digitalization and adapt it to their organization. Why it is important to understand what digitalization of the educational system means, how it may change and why it is significant. It requires digital competence, which can be seen as lifelong learning, which Jaldemark (2021) means is a lifelong process.

The schools' needs and conditions govern how the school organizer needs to organize and structure the digitalization work in the municipality. It is important since it affects students' outcomes and equality in and between schools, according to Bulman and Fairlie (2016). It does not need to be wrong that a municipality has not made certain technological leaps. In some cases, this can lead to skipping certain digital technologies when new solution proposals emerge. However, digitalization is an ongoing change process that does not stop. The public discussion and new digital technologies' solutions increase the need for expanding the use of digital technologies in schools and preparing students for the digital society. The school organizers do not talk so much about digitalization issues linked to schools' work environment issues. One reason for the lack of discussion around this can be a view that school organizers see this as a school leader's issue. However, the school organizers' knowledge, skills, attitudes, strategies, values, and awareness may reflect how schools prioritize and conduct digitalization work. This will be important to support children, and young people need to learn to handle information flows and be critical.

Dialogue in the network enables knowledge transfer between school organizers, which is a key for co-operation. Dialogue between school organizers, school leaders, and educators also is a key for collaborating to expand digital technologies in schools, which Ottestad (2008) has lifted up. Digital technologies in teaching are also an issue of how to use them, which influences quality, according to Bottino (2020). However, school organizers', school leaders,' and educators' attitudes to digital technologies affect how digital technologies are used in teaching.

The discussion above shows that networks between school organizers may contribute to various perspectives on digitalization work in the educational system. School organizers have similar challenges in implementing digital technologies in schools. By co-operating (Networked Learning Editorial Collective, 2020), school organizers share

with each other challenges and successful strategies for expanding the access and use of digital technologies in schools.

In summary, the school organizers network to expand the access and use of digital technologies in schools by learning from each other, having a holistic perspective, increasing knowledge on the subject, which influences their leadership, increasing knowledge about how to understand concepts influencing using of digital technologies, and equality in and between schools. However, there is a need for more research on networks between school organizers, especially based on these networks' challenges and opportunities. There is also a need for more research on networks' models for school organizers.

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Tracing analytic assemblages – doing doctoral research with actor-network theory

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Abstract

The practices of doctoral education are intricately entangled with technologies. This methodological paper examines the practical concerns involved in doing the analytic work in a networked learning setting with Actor-Network theory (ANT). It is a story about engaging with ANT as a companion in an ethnographic research project on teaching practices in Sweden during the Covid-19 pandemic. The empirical examples are pulled from online interviews in the pandemic outbreak and two ways of assembling the analytic practices of those interviews. On the premises that method and technology are non-neutral, the focus is on how the interviews are analysed and the modes of knowing that they form. For example, the paper examines how computer-assisted qualitative data analysis software acts on the analyses of the interviews and the knowledge patterns made possible and what signals are silenced. A second analytic assemblage is deployed that traces those signals. Based on the empirical examples of doing analyses, the paper discusses how analytic assemblages change and move research and the researcher in unpredictive and performative ways that troubles the expectations of a singularised doctoral journey.

Keywords

Actor-Network theory, analytic methods, tracing, NVivo 12, doctoral research

Introduction

In the story of doing doctoral research that I present in this paper, I am encouraged by Actor-Network Theory (ANT) scholar Law (2004, 2022) who over several decades has discussed the gap of moralising research methods on the one hand and the messier practical conducts of research method and analysis on the other. I think doctoral candidates are no strangers to this glitch. Careful step-by-step planning carries many promises but, we learn, can only go so far. It raises the question of whether it matters to doctoral education that research practices, including doctoral research, are non-linear, multiple, and sociomaterially distributed. In response to this question, calls have been made to re-think some conventions about doctoral education. For example, Taylor and Adams (2020) contest the singularised idea of 'a doctoral journey' with the nuance of journey*ings*. Similarly, Gravett (2021) unsettles the linear idea of the doctoral experience as one of departure and arrival by paying attention to acts of slowing down and affirming the many conflicting currents of thought in doctoral research. In Barnacle and Mewburn's (2010) networked account of the becoming of doctoral research(er), they centre on the often unnoticed mundane materiality, e.g. a lost lanyard, a book, and the fluxes of overlapping sites. These scholars have in common a concern for the mess and matters of doctoral research. I direct the same concern in this paper to the doings of analytic practices in my own work. I aim to examine this by foregrounding the computer-assisted qualitative data analysis software NVivo 12 in relation to the practicalities of doing qualitative research analysis.

In my doctoral research, I work with ANT to inform an ethnographic methodology with an upper secondary school in a small Swedish town. My thesis is a study of pedagogy in response to unexpected natureculture events. The empirical engagements with the teachers, their students, and the technologies started in May 2020, and I followed them to graduation in June 2021. This period was dominated by the practical encounters with the Covid-19 pandemic that challenged both the teaching and the research. However, in this methodological paper, I focus on the analytical challenges with an ANT approach that assumes a decentring of the human in research practices (e.g. Latour, 2005; Law, 2004). Exploring the analytic assemblages as devices for modes of knowing, is an opportunity to 'think hard about our relations with whatever it is we know, and ask how far the process of knowing it also brings it into being' (Law, 2004, p. 3). My questions are – how are analytic assemblages shaped and what knowledge and research positions do they shape?

Premises of an ANT approach to analysis

As a premise of this paper, I want to situate ANT as a specific relational ontological approach to doing research. ANT's approach to ontology, the matter of what is and what is becoming, is part of the 'ontological turn'/'material turn' in the social sciences and education research (see e.g. Bodén et al., 2019; Fenwick & Edwards, 2019; Gunnarsson & Bodén, 2021). This ontological turn deals with the decentring of the human in the practices of doing research, which has caught the interest of ANT researchers since its inception in Science and Technology studies (STS) in the early 1980s (see e.g. Latour, 2005). In the aim of decentring the social realm of the human, analytic attention can give room for matter as complexly entangled in livable more than human worlds; technology, nature, bodies and affect. However, this turn is not a return, or a reversal, to a materialism in which objects are subject to predictable causal forces and agencies. For ANT-scholars, objects, i.e. realities, are enacted of practices and cannot precede them. This means that an important premise is that what *is* cannot pre-exist its relations, it is performatively enacted of them. The performativity posits a relationally entangled and two-way movement so that worlds also enact practices that troubles both linearity and singularity. For the practices of doing research, of enacting methodologies and analyses, it suggests that research enacts realities rather than uncovers a reality that was already there passively waiting. An analytic assemblage can therefore be thought of as the assembling of practices to analyse signals and silences so that certain patterns are enacted. Analytic assemblages, at the same time, discern and amplify realities as modes of knowing them (Law, 2004, 2022).

In educational research, this ANT approach to research shares many premises with a post-qualitative approach to doing situated inquiry (Gunnarsson & Bodén, 2021; Jackson & Mazzei, 2012; MacLure, 2013; Mazzei, 2013). Post-qualitative inquiry is grounded on a feminist critique of the material-discursive binary that structures material realities as inaccessible beyond representations of language. I draw extensively on this scholarship in this methodological paper. For example, I appreciate MacLure's (2013) narration about 'relational thinking' to talk about doing research with an ANT-informed approach like mine. A relational thinking takes representation to be and establish a humanist premise, rather than decentring the human in relational research practices. Although legitimate, scholars of post-qualitative inquiry have argued that language has been too dominating and closed down other ways to account for educational research and limited the modes of knowing educational realities. However, the problem that presents to both ANT and post-qualitative inquiry is how to deal with a decentring of the researcher subjectivity while at the same time engaging the accountability of the researcher. In practice, becoming a doctoral researcher in a situated inquiry requires decentring without disengaging with the entangled analytic assemblage.

Ways of assembling analyses

Before moving into my examples of analytic assemblage, I want to give some context to the empirical work they come from. The Covid-19 pandemic outbreak and the restrictions during the first wave in 2020 meant I was unable to travel to the school for my ethnographic fieldwork. On deciding to work *with* the pandemic, not despite of it, I did a series of online interviews with six of the teachers in May 2020. The interviews were an approximation of ethnographic work and we focused on the practical doings of teaching during the pandemic outbreak and the mundane efforts needed to hold the everyday of school closure together and how any work-arounds were put in place. Thus, my focus was not on the teachers as individualised conveyers of human experience. The interviews initiated my relations with the school and unfolded into a longer-term empirical work on teaching and technology in emergency response. However, I am staying with the first online interviews in this paper. From the range of conventional research technology available to me, I did the interviews with Zoom and subsequently used NVivo 12 for transcribing, managing, and coding the interview data. Given that neither technology nor methods are non-neutral, which is an important assumption in ANT and my research, what effects did a technology like NVivo 12 have on the interview data and the possible knowledge(s) from it?

Analytic assemblage with NVivo 12

Supported by the specific configurations of NVivo 12, the initial coding I did was oriented at categorising themes of sameness. NVivo 12's computer software does this efficiently, which seems to give little room for any critical scrutiny. In a way, there is a representational thinking operating with NVivo 12 across the coded themes of sameness when the software aggregates the entries into generalizations of the data. For example, NVivo displayed to me that patterns in the coded data emerged, namely, on the difficulties with teaching to do with students not being visually (re)presented. Teachers were for example unsure of how to care for students' needs because they could not see the subtle signals for clarifications when the teaching took place in the Microsoft Teams platform. Did students understand the teacher's explanations? Who needed more help? For similar reasons, the teachers

struggled with examinations and assessment practices when they could not see the students in front of them in the same room. Were they cheating? 'Everyone' knew how easy students illicitly could use smartphones and chats etc. when taking the online tests. The pattern was repeated across every interview transcript and got a high percentage of coverage, which the NVivo software assisted with tracking.

This repeated theme of 'difficulties with out of sight teaching' was not a surprising outcome and I was uneasy with why I needed a qualitative analysis software like NVivo 12 to tell me so. Furthermore, I was frustrated at the overemphasis on difficulties because the interviews were also vibrant with tinkering and doings that were at the same time mundane and pressing in the specificities of the emergency response. In the patterns of sameness, there did not seem to be any room for knowing about the specificities or the irregular. The analysis seemed to work reductively so that the ambiguities and mess of the interviews were smoothed out, silenced, and relegated to some inaccessible background. As a mode of knowing, a quest for clarity was underway at the expense of ambiguity.

The analysis with NVivo also assembled the researcher in specific ways. Jackson and Mazzei (2012, p. 12) say about coded themes in qualitative research interviews that the coding takes the analyses away from data as it ends 'up' in macro generalizations. Importantly, the coding practices enact a distance between the researcher subjectivity and the research object. Consequently, that which is studied precedes in time and is external in space to the researcher, rather than being performatively enacted on the premises of a relational ontology, a relational thinking. Objectivity via disengaged distance renders an ethically problematic and 'invisible' researcher position from which it is difficult to be accountable for the research enactments. The convention in qualitative research on the issue of accountable objectivity is to deploy reflexivity from the researcher position. Post-qualitative scholarship has drawn attention to how research reflexivity relies on a subject centric epistemology that centres and amplifies the human, rather than a relational thinking (Gunnarsson & Bodén, 2021).

Knowledge contributions from interviews and NVivo 12 are no doubt possible and important. However, my argument in this paper is that the specific combination of interview data, NVivo 12, and the ANT-approach meant that the methodology, more specifically the analytic assemblage in my doctoral research, was at risk of contradicting itself. The ontological claim was to decentre the human and to privilege relations over representation. However, the effect of the analytic assemblage was heading in the opposite direction – it amplified teachers' voices as representational data. In other words, the methodology established the teacher subjectivity at the centre of all things, as 'voice', and asserted the unique human capability of representing and reflecting educational realities in separation from the central figure, as 'data'. The analytic assemblage with NVivo rendered the interview data as the mediator of truth between what was going on and how to know about it. It was regulated by a representational logic, rather than the ANT-informed relational thinking (MacLure, 2013).

This analytic assemblage was pulling my work to engage with voice, distance, discovery, and representation. More specifically, it was anthropocentric and did not decentre humanist and representational premises. It troubled the claims of exploring sociomaterial enactments of teaching and school closure that I aimed for. Being conflicted, I had reason to slow down and think more carefully about methodologies as world-making devices. The relational thinking asks of ANT-scholars to stay close to the studied practices, relations, and events in order to affirm, on the one hand, what may present as clear while, at the same time, embrace the ontological conditions of uncertainties, ambivalence, mess etc. There are other ways that analyses can assemble. I will now turn to the analytic method of tracing (Latour, 2005) by working with an empirical example from the interviews.

Analytic assemblage with tracing

The second instance of analytic assemblage involves a different set of materials and practices. Importantly, it includes a shift in the underpinning analytic question – from being geared at what was being said in the interviews to a performative focus on what the interviews were doing. I started to reconsider them as ethnographic events in an effort to decentre the interview method's discursive emphasis. In my work with the online interviews, I had taken notes that I could add as more material to the interview transcripts. My notes were on what had happened before, during and after the interviews; reactions, misunderstandings, technical mishaps, memories, etc. For the analysis, the notes added more relations and mess to the interview events, rather than reducing and clarifying what had been said.

Consider the following vignette, i.e. the narrative convention of ethnographic research, from one of the interviews. The teacher worked at the time from his empty classroom where he was sitting for our online interview.

> As the interview finished, and I turned the recording off thinking that the very informative interview was over, the teacher did something unexpected. He asked if I wanted a tour of his classroom. He then picked up his laptop with the web camera, turned it away from himself out into the room so that it was in my view, and scanned the space in a sweeping movement from one side to the next. The familiar view of an empty and abandoned classroom filled the screen. The space was uncanny. (May 2020)

The classroom was uncanny. The uncanniness was an affective response to the ambiguity of what is familiar, chairs-on-desks, and yet unfamiliar, in the middle of the day in the middle of the term, that speaks to spatial arrangements as something indeterminate. Up until that dense moment of confrontation the empty classroom had not been part of my research, merely rendered an abandoned and uninteresting container. The sudden turn of the camera and the lack of attention for the space enacted a cut that at the same time gave the room its spatial capacity to become agentic and affect me. The classroom was enacted of the entangled forces of space, time, and materiality. Its becoming was dependent on its momentary situated and traced relations to the Covid-19 pandemic, teaching, the movement of the camera, screen technology, and research interview.

It is the density of the unexpected virtual classroom tour event that makes it a relevant entry point for assembling an analysis with tracing. Tracing as an analytic method is not geared at discovering what is in waiting to be made sense of, contrary to my encounters with NVivo. It assumes an engaged researcher answerable to the research object and the enactment of analysis as a process of world-making. In the analytic assemblage of the classroom tour, both affect and ignorance are activated simultaneously to detect and amplify reality. Tracing is to make sensible, assemble and create links between the entities and sets of arrangements that enact educational realities. The analytic attention is on the momentary specificities of how human and non-human entities become influential in achieving and challenging more or less intelligible flows of practices. As a situated inquiry, the analytic assemblage has capacities to make a doctoral researcher visible and thereby accountable (Gunnarsson & Bodén, 2021; Moberg, 2018).

This analytic assemblage enacted aspects of reality that had escaped the representational logic of NVivo. For example, there was the materiality of space, an affective dimension, and uncanniness that has ambiguous and elusive qualities. These are signals and silences that escape the possibilities of representation. This analytic assemblage opened up for explorations of how pandemic pedagogies enact spaces for teaching and learning that are not disembodied and ‘online’ but spatially situated of bodies that are unequal before the Covid-19 pandemic. I started wondering about how the mundane teaching and technology practices made school ‘attendable’ for students during the school closure (see Mörtsell, 2022).

Concluding words

In this paper, I wanted to examine the practicalities of doing analytic work in doctoral research in a networked learning setting. When analyses assemble in different ways it is possible to trace the enactments of multiple modes of knowing and becoming of doctoral research. The analytic assemblage with NVivo privileged, that is it enacted and made possible, a representational thinking that asserted ‘voice’ as a reflection of truth and representation of essentialist subjectivity. It oriented the research at understanding and interpreting what the interview data meant, such as coding to uncover ‘what is in it’ (Jackson & Mazzei, 2012; Mazzei, 2013). This analytic assemblage enacts patterns of sameness that involve creating silences, which can be traced when the analysis is assembled in other ways. Materiality like software is part of the sociomaterial relations that shape those assemblages and the knowledge(s) made possible, including the researcher positions.

In line with Law (2004), it is not NVivo’s status as standard for doctoral candidates doing qualitative data analysis that I want to interrogate. Rather, my interest is in the normativities that come attached to NVivo, such as the assumption that a pre-existing reality can be accurately represented in code if done properly. It also suggests that not properly following the rules inevitably leads to a failure to understand reality. When qualitative analysis software assist in assembling research, as a labour-saving device, which relations are made expendable or erased? These are arguments and questions that help articulate how analytic assemblages are modes of knowing, as Law (2004) suggests. It raises the question of how multiple modes of knowing relate to each other. And how do these analytic assemblages enact specific conditions for the doctoral research process?

I want to end on an affirmative note. The argument in this paper suggests that the analytic assemblage that involved computer-assisted qualitative data analysis software was ‘wrong’, given the approach, and needed to be put ‘right’.

However, an affirmative conclusion would be to say that the analytic assemblage with NVivo was not a wasted effort because it enacted a slowing down and reconsideration that triggered additional research practices. The practical doings acted on the analytic assemblage and made other modes of knowing and research realities possible that in turn have opened for new research questions.

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Digital citizenship in teacher education – Exploring conceptualizations in a postdigital era

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Abstract

In a postdigital era, an increasingly important dimension of citizenship is digital citizenship, which is reflected for instance by digital civic engagement, fake news, and disinformation, not least during the Covid-19 pandemic. Teacher education (TE) prepares student teachers for the fostering of citizens in K-12 schools, and various conceptualizations of digital citizenship appear in educational research that could inform TE practice. This paper explores two common conceptualizations of digital citizenship in educational research, Ribble's nine elements of digital citizenship and Choi's four-category model, and critically examines how these reflect digital citizenship in a postdigital era, including potential implications for TE. The paper shows that neither conceptualization fully reflects digital citizenship in a postdigital era although Choi's model mirrors some characteristics, for instance a blurredness between binaries such as "online" and "offline", and a multi-faceted understanding of citizenship and digital technologies. Critically analyzing digital citizenship is important as the conceptualizations informing TE may impact the preparation of future teachers to teach for digital citizenship in a postdigital era.

Keywords

Digital citizenship, Postdigital, Teacher education, Networked learning

Introduction

In a postdigital era (Jandrić et al., 2018) digital technologies place new demands on citizenship through the blurred boundaries between human and non-human entities (Burbidge, Briggs & Reiss, 2020), the physical and the digital, technologies, and social networks (Frau-Meigs, O'Neill, Soriani, & Tomé, 2017), which can be referred to as *digital citizenship*. Examples of why digital citizenship is important include among others the impact of digital technologies on civic engagement (Cho, Byrne, & Pelter, 2020), disinformation (Frau-Meigs et al., 2017), post-truth politics in the context of social media networks (Hasen, 2020), digital surveillance (Colaresi, 2020), artificial intelligence (Burbidge et al., 2020), and feedback loops ("echo chambers"; Noveck & Cerf, 2020), all of which place new demands on citizenship. A case in point is the recent Covid-19 conspiracy theories on social media, which have been linked to increasing radicalization of beliefs and social norms, including actions beyond social media (Dow et al., 2021).

Teacher education (TE) prepares student teachers for the fostering of democratic citizens in K-12 schools (cf. Swedish National Agency for Education, 2018) which, globally, are increasingly characterized by digital technologies such as hardware, software, and infrastructure, changing the conditions for teachers' work (Starkey, 2020). Given the new demands placed on citizenship in a postdigital era and teachers' work fostering democratic citizens, digital citizenship also concerns TE. As education in Swedish K-12 schools is to be "based on scientific grounds and proven experience" (Swedish National Agency for Education, 2018, p. 4), teacher educators (including student teachers and teachers) look to educational research for support. Among the different conceptualizations of digital citizenship in education (see Heath, 2018), Ribble's nine elements of digital citizenship and Choi's four-category model are common and thus likely to be considered in TE. As the ways digital citizenship is conceptualized in TE may impact future teachers' preparation for the fostering of democratic citizens in K-12 schools, the purpose of this paper is to explore Ribble's and Choi's conceptualizations of digital citizenship, critically examining how these conceptualizations reflect the demands placed on citizenship in a postdigital era. Lastly, the paper highlights potential implications for TE.

A postdigital era

A postdigital era is characterized among others by the blurred boundaries described above between human and non-human entities, the physical and the digital, technologies, and social networks. The *post* does not refer an "after-the-digital" (Taffel, 2016) but a critical approach to technology, society, and grand narratives which often follow a specific trajectory of technology development. This can be contrasted with the postdigital, multi-faceted understanding of digital technologies where a pluralism of perspectives is possible even when seemingly in conflict. Ontologically, instead of positioning the digital as different from "traditional" practices, the digital is considered *embedded* in social, economic, and political contexts whereby people and society are shaped directly and indirectly (Cramer, 2014; Knox, 2019). Therefore, the postdigital is incompatible with binary oppositions such as online-offline and digital-material, which in fact are viewed as detrimental (Networked Learning Editorial Collective [NLEC], 2021). The descriptions above reflect the influence from critical philosophy of technology, science and technology studies, and critical posthumanism, but the postdigital also draws on critical pedagogy in seeking to "actively participate in its [the world] development and to enable the widest spheres of society to participate as well" (Jandrić, 2021, p. 29).

Between networked learning (NL) and the postdigital, there are overlaps given the focus on entanglements of humans and technologies, primarily digital technologies, rooted in critical and emancipatory educational traditions (NLEC, 2021). Among the different definitions of NL (Gourlay et al., 2021), this paper uses the following:

> Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies. Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources and solutions, across time, space and media. (NLEC, 2021, p. 320)

This paper broadly recognizes the points made by de Laat and Bonderup Dohn (2019) that while the postdigital and NL are compatible in many ways, they are not necessarily the same. de Laat and Bonderup suggest that one way in which NL transcends the postdigital is a strive to go beyond formal education settings, referring to Jandrić and colleagues' (2018) seminal publication on the postdigital on which this paper draws.

In contrast, this paper argues that the postdigital emphasis on *embeddedness* of digital technologies reflects how digital citizenship can be non-linear and interrelated with the material world (cf. Choi, 2016) in ways that include contexts outside of education, which are important for young people's citizenship formation (Olson, Fejes, Dahlstedt & Nicoll, 2014). Moreover, NL practices emphasize connectedness where teachers take a step back and students experience learning primarily through collaboration and cooperation (McConnell et al., 2012; cf. Jones, 2015). However, as different conceptualizations of digital citizenship could impact future teachers' preparation to teach for digital citizenship and, in turn, K-12 pupils' citizenship formation, this paper stresses the importance that teacher educators' (and teachers') practices be informed in the context of digital citizenship. This may require teacher educators and teachers to play a more active part than has often been described in NL literature, which is not without recent examples of citizenship discussions although the focus has been higher education broadly (e.g., Nørgård, Mor & Bengtsen, 2019) and not TE specifically. In this regard, the paper, although it has a postdigital focus, could contribute to informing NL design and practice in the context of digital citizenship in TE.

Citizenship beyond the nation-state

While citizenship over time has been widely debated in social science, few shifts occurred until a broadened understanding of citizenship emerged at the end of the 20th century (Banks, 2008; Yuval-Davis, 1997). Previously, Marshall's (1950) triadic conception of citizenship was long influential, which described the relation between citizens and nation-states in terms of elements: civil rights (e.g., the right to justice), political rights (e.g., the right to political participation), and social rights (e.g., the right to education).

Toward the end of the 20th century, criticism increasingly challenged the Marshallian conception and, increasingly, scholars embraced a broader understanding of citizenship focusing on *dimensions*. For example, following migration flows and globalization, people may hold multiple citizenships, be refugees, or identify in ways that do not solely reflect the nation state of residence, which is why some scholars argue for multicultural and transformative citizenship (Banks, 2008), global citizenship (e.g., Andreotti, 2006), and cosmopolitan citizenship (Osler & Starkey, 2018). Another example is Yuval-Davis' (1997) focus on citizenship and gender where citizens are collective members of different sub-, cross-, and supra-national groups. These examples focus

on dimensions, for instance identity and culture, where citizenship becomes something individuals both have and do (van Gunsteren 1998/2018). This last point is important; for example, having citizenship can result in privileges that impact how citizens do citizenship, which is why broadened conceptions of citizenship must be considered alongside more "traditional" approaches (Choi, 2016).

In a postdigital era (Jandrić et al., 2018), or assuming an NL perspective foregrounding digital networks (Jones, 2015), digital citizenship is an increasingly important dimension of citizenship (Carretero, Vuorikari & Punie, 2017; Choi, 2016; Frau-Meigs et al., 2017). Referring to digital citizenship could seem incompatible with the embeddedness of the postdigital and its skepticism of binary oppositions, and therefore a valid question is why not use the term *postdigital* citizenship. With its own body of literature, digital citizenship serves to draw attention to questions concerning citizenship in relation to digital technologies, referring to one of many interrelated dimensions of citizenship which are not mutually exclusive; for example, it is possible to discuss global citizenship, digital citizenship, and gender. In this way, *digital* citizenship signals that there is something to talk about when it comes to citizenship similar to the way *post* signals that there is something to talk about when it comes to the digital (cf. Sinclair & Hayes, 2019).

Conceptualizing digital citizenship

As a field, digital citizenship is messy. It lacks a seminal definition (Frau-Meigs et al., 2017) and draws interest from many directions, for instance various academic disciplines (as reflected by recent literature reviews, e.g., Jørring, Valentim & Porten-Cheé, 2018), supranational organizations such as the European Union (e.g., Carretero et al., 2017), and non-government organizations (e.g., International Society for Technology in Education, 2019). Also creating difficulty to survey the field of digital citizenship are closely-related concepts such as networked citizenship (e.g., Lokot, 2020), and studies that feature digital citizenship but without explicitly stating so (Heath, 2018).

Broadly, conceptualizations of digital citizenship commonly include the use of technologies to participate in society in relation to knowledge, skills, attitudes, and behaviors. For example, Lindgren defines digital citizenship as "opportunities and resources … to participate online in society and politics … a combination of having access to the tools of participation, as well as having the right skills or literacy with which to use them" (2017, p. 147). This definition reflects the broadened understanding of citizenship as a combination of having (opportunities, access, skills, literacy) and doing (participate, use).

In analyzing conceptualizations of digital citizenship, several scholars have highlighted three categories of approaches (e.g., Choi & Cristol, 2021; Heath, 2018; Jørring et al., 2018). The first category is *unidimensional*, characterized by the impact of the discipline (e.g., education, new media, political science) in relation to the specific aspect to be foregrounded, which in education often translates into an ideal type of citizen through a normative focus on responsible technology use. The second category is *multidimensional*, focusing on several aspects of digital citizenship, which tend to emphasize an ideal type of citizen linked to the use of technologies for participation in society, for instance information retrieval and online participation. While also multidimensional, the last category is characterized by *critical, radical, and social-justice oriented approaches* to digital citizenship, for example highlighting power and social inequalities in relation to marginalized groups, which rejects the notion of one ideal type of citizen and instead highlights a pluralism of digital citizenship.

In education, some conceptualizations of digital citizenship are more commonly referred than others. Ribble's unidimensional approach defines digital citizenship as "the norms of appropriate, responsible behavior with regard to technology use" (2015, p. 15). In contrast, Mossberger, Tolbert, and McNeal's multidimensional approach include aspects linked to participation, characterized by frequent technology use "for political information to fulfill their [citizens'] civic duty, and ... at work for economic gain" (2007, p. 2). Some multidimensional approaches bridge the two above by focusing on both norms and civic engagement (e.g., Jones & Mitchell, 2016). Others argue that neither of these approaches is sufficient to capture what digital citizenship means and advocate for critical approaches in line with the third category described above (e.g., Choi, 2016), for example focusing on power hierarchies in technology-rich environments (cf. Heath, 2018). Also commonly referred in educational research are European Union publications on digital citizenship, such as "DigComp" (Ferrari, 2013), "DigComp 2.1" (Carretero et at., 2017), "DigCompEdu" (Redecker, 2017), and *Digital Citizenship Education* (Frau-Meiggs et al., 2017), which link digital citizenship for instance to work, lifelong learning, participation, and responsibility reflected by the European Commission's (2021) goals for 2030.

While conceptualizations of digital citizenship in educational research often focus on responsible technology use and (political) participation, these are only some aspects of digital citizenship. Therefore, there is a need for research to cover a larger part of the digital citizenship continuum, including critical approaches (Heath, 2018), which this paper addresses by critically examining two common conceptualizations of digital citizenship in a postdigital era, promoting a discussion of educational matters in ways that reflect the embeddedness of digital technologies in society (cf. Knox, 2019).

Digital citizenship formation in TE: Three arenas to consider

In TE, teacher educators prepare student teachers to teach for citizenship. In this context, citizenship formation applies to several levels or "arenas": higher education as a place of ideas and resources relating to citizenship, TE institutions as places of preparation for student teachers to teach for citizenship, and K-12 schools as places for student teachers' practical work placement and future careers.

First, higher education is an important arena for citizenship formation (Bryer, 2014; United Nations World Declaration on Higher Education for the Twenty-First Century: Vision and Action, 1998). Teacher educators and student teachers engage with traditions of thought that can promote and inhibit new ideas when it comes to citizenship and the development of resources to "bring about its flourishing in any given society" (Annette & McLaughlin, 2005, p. 61). Thus, at a type of meta level of TE which perhaps is not always explicated, higher education is an arena for digital citizenship formation. Also, if digital citizenship is not addressed on this arena, this is also a type of contribution to citizenship formation but one of absence of consideration.

TE institutions form another arena for digital citizenship formation in TE, and the way TE institutions prepare student teachers for the democratic assignment in K-12 schools where teacher educators have an important role (Raiker & Rautiainen, 2020). This includes interpreting TE Degree Objectives, designing programs and courses accordingly, and considering relevant documents such as national K-12 curricula (Edling & Liljestrand, 2020), which in the case of Sweden feature digital citizenship although the term is not used explicitly (Christensen, Biseth & Huang, 2021).

A third arena for digital citizenship formation in TE is K-12 schools. This is the place for student teachers' practical work placement, and as such it is important when it comes to their development of skills and knowledge to teach with technology (Baran et al., 2019), including teaching for digital citizenship (cf. Gudmundsdottir & Hatlevik, 2020). K-12 schools are also the places of student teachers' future careers. In other words, K-12 schools constitute an important arena for digital citizenship formation in TE as student teachers (and as future teachers) have opportunities to link theory and practice and gain experience. It is also a place where they will encounter school cultures and their traditions of thought and practice, which may impact the way teachers teach (or not) for digital citizenship.

These levels or arenas illustrate that when examining conceptualizations of digital citizenship in TE, citizenship formation could occur in different places and on several levels connected to TE. Certainly, this list of arenas can be problematized as it is by no means inexhaustive. For instance, if K-12 pupils are considered, further complexity is added as formal education spaces are important to citizenship formation (Beach & Öhrn, 2011) as is young people's everyday life outside formal education (Olson et al., 2014). Another example is expanding the discussion of each arena, for instance, in what ways higher education or TE reflects a networked university and the potential implications for citizenship formation processes (cf. Nørgård et al., 2019).

Broadly, while citizenship in education has often been the focus of scholarly work, the demands placed on citizenship in a postdigital era in relation to teachers' fostering of democratic citizens in K-12 schools call for a renewed focus on citizenship in TE, focusing on digital citizenship. This section shows that when it comes to TE, citizenship formation is complex, occurring on many levels or overlapping arenas, and these need to be considered to understand the context in which teacher educators and student teachers engage with digital citizenship conceptualizations.

Ribble and Choi's conceptualizations of digital citizenship

The remaining sections of the paper explore Ribble's nine elements of digital citizenship and Choi's four-category model, examining critically how these reflect digital citizenship in a postdigital era, and the implications for TE are discussed in the concluding remarks. It is worth noting that although these conceptualizations are common in educational research, their origins differ. The theoretical and empirical grounding in Ribble's approach is

somewhat unclear and has thus drawn criticism (Heath, 2018; Noula, 2019). Choi's conceptualization, on the other hand, stems from a concept analysis of articles, white papers, book chapters, blog posts, and websites, but this non-restrictive approach to sources materials has received criticism (Jørring et al., 2018). Below, quotation marks indicate phrases and expressions used by Ribble and Choi, which may be useful in understanding how these conceptualizations reflect a postdigital era.

Ribble's nine elements of digital citizenship

In Ribble's (2015) unidimensional approach to digital citizenship, education as a discipline impacts the aspect of digital citizenship to be foregrounded, which in this case is the norms of appropriate and responsible technology use divided into nine elements:

- Digital access
- Digital commerce
- Digital communication
- Digital literacy
- Digital etiquette
- Digital law
- Digital rights and responsibilities
- Digital health and wellness
- Digital security

These elements reflect technology use in a "digital society" characterized by interaction between technology users and emerging "opportunities" and "advantages" in social, work-related, and educational contexts. These advantages entail certain responsibilities for citizens who need to understand "the good and the bad of technology" and become citizens "of character and integrity" that can contribute as "members of a digital society" and teach others how to use technology appropriately. In education, technology is to enhance learning, and it is essential that education provides consistency in relation to digital citizenship (Ribble, 2015).

In a postdigital era, Ribble's conceptualization of digital citizenship seems narrow. Society according to Ribble is characterized by interaction between technology users. While interaction is also highlighted in a postdigital era, it is not limited to human users but blurred and broader, for instance spanning relations between human and non-human entities, the physical and the digital, and social networks, the latter shared also with NL.

Moreover, Ribble's emphasis on technology use suggests distinct boundaries between users and technology. Users use technology for certain purposes in contexts characterized by new opportunities and advantages, which indicates an optimistic, technology-determinist trajectory. This is in stark contrast with the postdigital and its multi-faceted understanding of the digital, which challenges such linear technology narratives, including the view of technology as something distinctly external with specific properties that are either "good or bad".

Similarly, Ribble conceptualizes an ideal type of citizen to become, which means that until then, one is not a "full-fledged" [sic] citizen. In digital citizenship, predefined areas such as commerce, communication, literacy, responsibilities, and health are important "starting points", which again are in contrast with the pluralism of the postdigital. Ribble's notion of an ideal citizen also seems incompatible with the traces of critical pedagogy in the postdigital. For example, there is no social-justice oriented ambition, such as examining power and communication. Rather, there are neoliberal underpinnings depoliticizing citizenship where citizens behave appropriately and responsibly, adhering to laws and regulations, focusing for instance on commerce and taking care of themselves (cf. Noula, 2019), which Ribble consistently locates to a sphere that is distinctly digital.

Choi's four categories of digital citizenship for "the internet age"

Choi's (2016) multidimensional and critical approach to digital citizenship is based on a view of society as "digitalized and networked" where "emerging digital media and web-based networking elements" enable new intra, inter, and macro perspectives on citizens' social world. Despite references in various forms to the internet (e.g., the Internet, the Internet age, internet-driven approaches to citizenship), distinctions such as "online" and "offline" are blurred in Choi's conceptualization, which covers four categories:

- Ethics
- Media and information literacy
- Participation/engagement
- Critical resistance

The ethics category broadly echoes Ribble's focus on responsibility above. Where Ribble refers to the interaction between technology users, Choi (2016) discusses Internet users who engage in "Internetworking activities". Media and information literacy refers to access to and use of digital technologies online. In this regard, Choi's conceptualization reflects ideas of a "digital divide" between those who have the skills, knowledge, and access to use digital technologies and those who do not, which Choi to some degree links to a critical perspective on power and politics, that is one of the categories in the model. This participation/engagement category recognizes that participation and engagement can be political directly political (e.g., engaging in discussions on social media with political parties) and indirectly (e.g., everyday actions such as reposting a meme) where the internet is a new public for participation in the form of "Internet activities". Although hard to distinguish from participation/engagement at times, the critical resistance category in the model is about participating in "virtual communities" but linked to social justice, for instance including political activism and critically examining digital citizenship education that reinforces the status quo. Despite the emphasis on the Internet and virtual communities, Choi argues that digital citizenship is non-linear and goes beyond distinctions such as "online" and "offline".

Compared to Ribble, Choi's multidimensional conceptualization of digital citizenship reflects broader aspects of citizenship in a postdigital era. Society is not merely digitalized but networked, drawing on Castells as does some NL literature (cf. Jones, 2015). Instead of Ribble's technology development narrative where digitalization of society has given rise to new rights and responsibilities, Choi describes emergent digital media, a process of change that may still be ongoing or "emerging". The emergent digital media results in a pluralism of perspectives, which could reflect the multi-faceted understanding of digital technologies in the postdigital. A perhaps more evident, ontological reflection of the postdigital in Choi's conceptualization is the blurredness of the online and the offline. Still, Choi's conceptualization seems to position "users" and technology as distinct entities. Also, the role of non-human agents is unclear, which affects the degree to which Choi's conceptualization ontologically reflects a postdigital era.

The postdigital is perhaps more strongly articulated in the intellectual roots on which Choi's conceptualization is based. Echoing critical pedagogy, there is a social-justice oriented ambition present in Choi's conceptualization even if it is sometimes hard to distinguish from the participation/engagement category. In other words, whereas Ribble conceives of an ideal type of citizen, Choi rejects such typologies and implicitly opens for an understanding of digital citizenship that is not confined to a specifically "digital" sphere but fluid or, using postdigital vocabulary, *blurred*. Furthermore, returning to the claim that the postdigital is limited to formal education compared to NL (NLEC, 2021), Choi's conceptualization includes both formal and informal spaces for citizenship formation and thus seems compatible with the postdigital in this regard. However, the links to formal and informal spaces reflect an emphasis on activities relating to political participation rather than critical resistance, for example, against the status quo.

Thus, while Ribble's and Choi's conceptualizations of digital citizenship share the focus on ethics, they diverge in many ways. Some of the examples are summarized in the table below.

	Ribble's nine elements	**Choi's four-category model**
Society	Digital	Digitalized, networked
Citizen typology	Yes	No
Technology	Used by humans Linear trajectory Distinct boundaries (e.g., "good", "online")	Used by humans Emergent, multi-faceted Non-linear digital citizenship, tendency toward blurred boundaries
Context	Social, work, and educational contexts Formal spaces	Social (intra, inter, macro) Formal and informal spaces
Critical, social justice	No	Yes
Critique(s)	Lacking explicit consideration for interaction between humans, non-human entities, networks Technology-determinist Not "full" citizen by default Citizenship to be achieved in line with neoliberal underpinnings	Lacking explicit consideration for role of non-human entities

Table 1: Digital citizenship in Ribble (2015) and Choi (2016)

Concluding remarks

The purpose of this paper was to explore two conceptualizations of digital citizenship common in educational research, namely Ribble's nine elements and Choi's four-category model, and examine critically how these conceptualizations reflect the demands placed on citizenship a postdigital era, including potential implications for TE. This is important as teacher educators play a key role in preparing future teachers for the fostering of democratic citizens in K-12 schools (Raiker & Rautiainen, 2020) and, as education is to be based on scientific grounds, teacher educators (including student teachers and in-service teachers) look to educational research for support.

This paper highlights that when examining conceptualizations of digital citizenship in TE, citizenship formation may occur on several levels or "arenas" which are important to consider: higher education broadly as places for engaging with traditions of thought and developing resources for citizenship, TE institutions as places for interpreting TE Degree Objectives and designing TE programs to prepare student teachers for the fostering of democratic citizens, and TE in relation to K-12 schools as places for student teachers' practical work placement and future careers. Considering these arenas is important to understand the context in which teacher educators and student teachers engage with digital citizenship conceptualizations, which may impact future teachers' preparation to teach for digital citizenship in a postdigital era.

As to the conceptualizations, the paper shows that Ribble's unidimensional conceptualization of digital citizenship does not reflect a postdigital era but in fact is incompatible. Reflecting technology determinism, Ribble attributes properties to technology in ways that are value-laden where citizens are propelled by technology into the future along a specific trajectory, and to become "full" citizens, people need to use technology in specific ways, which demands levels of conformity (Noula, 2019). In TE, such an approach could result in teacher training that does not aptly consider the embeddedness of digital technologies in society (cf. Knox, 2019) and a limited conceptual scope of digital citizenship with which student teachers engage. Consequently, this could impact future pupils' citizenship formation.

In contrast, Choi's multidimensional conceptualization accommodates more aspects of digital citizenship by going beyond ethics, including media and information literacy, civic engagement, and critical approaches to digital citizenship. As opposed to Ribble's "citizen-to-become", Choi rejects the notion of an ideal type of citizen. Moreover, echoing the influence of critical pedagogy in the postdigital (Jandrić, 2021), Choi's conceptualization includes elements of social justice. Choi also hints at a multi-faceted understanding of digital technologies, including entanglement of humans, technologies and a plurality of ways in which people and their social world are impacted. In this regard, Choi echoes some concepts central also to NL, such as entanglement and the outlook on society as networked. This could also be interpreted as a postdigital blurredness between the digital, the physical, and social networks, which is reflected for instance by the emphasis on how digital citizenship is

"interrelated but non-linear with offline (place-based) civic lives" (Choi, 2016, p. 565). However, it is unclear how Choi views other aspects of the postdigital, for instance relations between human and non-human entities. In relation to TE, Choi's conceptualization still has the potential to reflect digital citizenship in a postdigital era, its conceptual scope is larger, and it does not demand conformity but strives to challenge it. A likely consequence is that student teachers engaging with Choi's conceptualization would be prepared to teach for digital citizenship in ways that reflect the core meanings of the Swedish K-12 curricula to a larger degree than if they had adopted Ribble's conceptualization of digital citizenship.

In conclusion, neither of these conceptualizations can be said to reflect a postdigital era although Choi's four-category model has potential, which is important if the ambition is to discuss education in ways that consider the embeddedness of digital technologies in society. Critically examining conceptualizations of digital citizenship is also important as the implications of engaging with different conceptualizations are quite different (Heath, 2018; Jørring et al., 2018; Noula, 2019). This paper contributes to the literature by focusing on how conceptualizations of digital citizenship in TE can impact future teachers' preparation to teach for digital citizenship in a postdigital era, and it stresses the importance that teacher educators' (and teachers') practices be informed in the context of digital citizenship. In this regard, the paper can contribute to informing NL design and practices, highlighting the role of active teacher educators and teachers who act in deliberate ways, for instance to challenge narrow conceptualizations of digital citizenship.

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Relationality, Networked Learning and Árbediehtu-traditional Sámi knowledge

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Abstract

The purpose with this paper is firstly to investigate whether an Indigenous, multidimensional, relationally intertwined onto-epistemology is present in a policy document regarding árbediehtu, traditional Sámi knowledge. The policy identify knowledge claims the Sámi parliament in Sweden wants to pass on to future generations, and is the closest to a Sámi produced curriculum we get in a Swedish context. A four-dimensional relational framework where relationality is unpacked through resonance theory by Hartmut Rosa is utilised as an analytical tool. Secondly, implications for Networked Learning, especially as occurring in remote Sámi language education, are elaborated on. The findings show that the framework can be helpful for understanding and describing a multidimensional relational onto-epistemology as relationships in the policy can be identified on three of the four dimensions in the framework. The last dimension involves the self and is mainly a reflexive tool. However, as the discussion initiated in the concluding section indicates, implications for Networked Learning and remote Sámi language education is not the only take-away. An unpacked understanding of relationality offers a glocalised as-well-as theoretical approach, which is important both locally and globally as issues of sustainability call for the development of a new social contract. According to resonance theory, resonant relationships are transformational, leading to the conclusion that a relational approach can lead to an increased understanding of learning and knowing, and a sense of self-efficacy and a stronger identity, all important aspects in transformational education. Further, the study is an example of how a national graduate school, GRADE, can offer epistemic space when researching digital technologies in education.

Keywords

Relationality, resonance theory, epistemic space, Indigenous relational onto-epistemology, árbediehtu, Networked Learning.

Introduction

In 2020, I presented an Indigenous Strategy of Inquiry supporting Networked Learning (Parfa Koskinen, 2020a) at a symposium at the 12th International conference on Networked Learning. Aimed at informing a PhD study on remote Sámi language education, the strategy outlined findings from an Indigenous research paradigm analysed in relation to concepts from the expanded theory on Communities of Practice (Wenger, 2010). The overarching aim of the dissertation is to review, problematize and develop the conditions for Sámi efflorescence through remote Sámi language education. The Sámi are the Indigenous peoples of Sápmi, the northern parts of what today is more known as Sweden, Norway, Finland and Russia (see e.g. Gaski, 2015 or Cocq, 2017). Remote education is to be understood as synchronous education where teachers and pupils are remotely located to each other in space but not in time, relationally entangled in networked technologies.

This is an example of cross-disciplinary research bringing along specific complexities from several intersecting fields, two of which are remote education and Sámi language education. Remote education is from a legislative perspective described as a second best option that should be avoided if possible (SFS 2010: 800, SOU 2017:44). One area where this can be seen is in arrangements for pandemic-related emergency remote education, which the Swedish government has recently decided to remove from the 1st of April 2022, still allowing extended face-to-face education on week-days, week-ends and on holidays (https://www.regeringen.se/pressmeddelanden/2022/03/mojligheten-att-bedriva-fjarr--eller-distansundervisning-pa-grund-av-pandemin-tas-bort/). This is interesting as it of today is rare to find educational practices not entangled in online digital technologies (NLEC, 2020). Additionally, Sámi language education has a long subordinate history of oppression and discrimination in relation to the surrounding national states (see for example Magga et al., 2005),

which has led to all Sámi languages being severely endangered or extinct (Cocq, 2017; Sapir, 2020). In combination, these areas automatically situates the research in a politically complex landscape. One complexity deals with "...which or whose knowledge system is being enacted" (Meighan, 2021, p. 398).

As shown by Svonni (2015), Sámi culture, values, traditions and knowledge only have a minor place in the Swedish national curricula. The closest to a Sámi produced educational policy we can get in a Swedish context is when the Sámi Parliament presents knowledge claims they wish to pass on to future generations (Nordin Jonsson, 2010), also described as árbediehtu. Árbediehtu is north Sámi for traditional knowledge. When taking part of the policy, there seems to be an expanded notion on relationality present that I recognize from the earlier mentioned investigations of an Indigenous research paradigm where relations and relational accountability are two reoccurring concepts (see for example Battiste, 2000; Chilisa, 2019; Kovach, 2010; Kuokkanen, 2000; Smith, 2012 or Wilson, 2008). This notion on relationality, however, moves beyond individuals and a social context (Wenger, 2010) involving all kinds of entities regardless of time and space, an onto-epistemology described as follows:

> Every individual thing that you see around you is really just a huge knot - a point where thousands and millions of relationships come together. These relationships come to you from the past, from the present and from your future. This is what surrounds us, and what forms us, our world, our cosmos and our reality. We could not be without being in relationship with everything that surrounds us and is within us. Our reality, our ontology is the relationships. /.../ some of these knots of relationships are not visible or tangible entities, but they are there just the same. They are developing ideas, grand abstractions, entire systems of thinking. This is our epistemology (Wilson, 2008, p. 76-77).

The earlier mentioned complexities indicate that the issue of Indigenous peoples and digital technologies "go far beyond the purely technical" (Dyson, 2015, p. 1), calling for a multidisciplinary approach. This give reason to ask several questions, of which I focus on two in this paper. How can relationality in the Árbediehtu-policy (Nordin Jonsson, 2010) be understood and described? What implications does an unpacked notion on relationality have for Networked Learning, and especially as occurring in remote Sámi language education? As the reading of a text lead the readers in different directions, some agency has to be ascribed policies and other types of documentations (Säljö, 2012). This would in resonance theory be referred to as the text playing first tuning fork potentially "setting off" the reader (Rosa, 2019) why it is interesting to investigate what kind of relationships the policy wants to encourage. To answer the above questions I have therefore unpacked relationality through resonance theory by Rosa (2019), resulting in a four-dimensional, relational framework which I utilise as an analytical tool for understanding and describing the Árbediehtu-policy. The result of the analysis is presented in a separate section as an answer to the first question. A starting point aiming at answering the second question is outlined in the final discussion, but I am hoping for a developing of these ideas together with others.

The backdrop of the study is provided in the next section where I further develop the interdisciplinary positioning of the study, and outline why it, according to epistemic logic (Chalmers, 2011) is epistemically possible for a relationally intertwined onto-epistemology. Following is a description of the theoretical framework (Rosa, 2019), a presentation of the analysis and finally, a discussion where I elaborate on implications for Networked Learning and remote Sámi language education.

Backdrop

Interdisciplinary positioning

The context for presenting this paper is at the 13th International conference on Networked Learning at a symposium especially focusing on whether two national graduate schools in Sweden, GRADE and UPGRADE, provide epistemic spaces for researching digital technologies in education from different perspectives and paradigms. An important notion, however, is that in order to understand what conditions are created for each individual graduate student to utilise the potentially available epistemic space, one also have to consider the influence of local and disciplinary modes of being, career and institutional position as well as physical location (Brodin & Avery, 2020). Regarding transcultural and First Nations doctoral education, the supervisors also play a crucial role in facilitating and encouraging epistemological border-crossing (Qi, et al., 2021). Consequently, there might be epistemic space not utilised as such by the participants in GRADE and UPGRADE for different reasons unknown to others. All the above, I believe, are not easily captured at a short symposium of this sort, but hopefully an increased interest might be the outcome encouraging further research on the conditions for graduate students.

Networked Learning and GRADE graduate school are both dealing with the entanglements of the taken for granted digital infrastructures of today, which create "rich meshworks of learning relationships" (NLEC, 2020, p. 2013). Aspirations within the Networked Learning community to promote emancipation and social justice is promising as the Networked Learning community is reported to have left a "significant trace in educational transformations over the last decades" (Gourlay et al., 2021, p. 327). As networked learning is one of the fundamental pillars of the graduate schools GRADE and UPGRADE, the Networked Learning community is a suitable and exciting context for presenting results from our various research approaches. Although GRADE focus on digital technologies in the intersection of educational sciences and digital technologies in education, the focus of my thesis lies in pedagogical issues but is highly cross-disciplinary in character in the sense of integrating knowledge and skills from more than one school of thought (Brodin & Avery, 2021). Research on remote education in a Swedish context is still comparatively scarce (Pettersson & Hjelm, 2020), but a lot has been done in the last few years (see for example Billmayer et al., 2020; From, Pettersson & Pettersson, 2020; Pettersson & Lindfors, 2021; Pettersson, 2021; Pettersson & Näsström, 2020; Stenman & Pettersson, 2020 and Öjefors Stark & From, 2020). My approach complements these examples of research conducted by several of my colleagues.

Within an Indigenous research paradigm, an increasing interest in digital technologies can be identified. For example, Rolleston et al. (2021) are dealing with how Māori and Tauiwi (non-Māori) can collaborate and work through misunderstandings due to different worldviews when designing software. Meighan (2021) asks whether digital and online technologies can assist in Indigenous language revitalisation and provides a synthetization of key takeaways from the past three decades, concluding that "Indigenous communities, content creators, scholars and visionaries have contributed to an ongoing decolonization of the digital landscape" (abstract, p. 397). This decolonization has reportedly been going on since the creation of the Word Wide Web in 1989 (ibid.), something Roche, Maruyama and Kråik (2018) would refer to as a slow revolution, i.e. an Indigenous Efflorescence. Three of the chapters in their book focus on Sámi examples of Indigenous Efflorescence in digital environments (Cocq, 2018; Outakoski, 2018; and Sedholm, 2018). In 2016, an anthology on Indigenous people and mobile technologies even talk about an "Indigenous Mobile Revolution" (Dyson, Grant & Hendriks, 2016, p. 1).

Although research across disciplinary boundaries is today encouraged politically as addressing global challenges (Brodin & Avery, 2020; UNESCO, 2021), Indigenous perspectives, research approaches and worldviews are still marginalised. As a counteraction in the educational field, UNESCO in 2019 initiated Futures of Education, Learning to Become (UNESCO, 2021). The initiative aims at exploring and challenging established ways of thinking about education, knowledge and learning, and move towards a sustainable, desired future (ibid.), i.e. widening the available epistemic space. UNESCO seems to support that "First Nations and transcultural approaches to knowledge production, which historically have too often been belittled and excluded, represent rich epistemological resources for research" (Qi et al., 2021). The available epistemic space to express a relationally intertwined onto-epistemology has hence increased.

Pesambili (2021) is the contributor coming closest to my aim with this paper, offering a "glocalised design" (abstract, p. 406) as a way of utilising and expanding the available epistemic space. I agree that through encounters between two knowledge systems in tension, a dialogical space opens where interrogations, negotiations and productive dialogue can create mutual understandings (ibid.). I thus prefer to describe my approach as an "*as-well-as* theoretical focus" (Bagga-Gupta, Messina Dahlberg and Lindberg, 2019: xii) providing a complementary piece to the most commonly used learning theories. By doing this, the content of the paper aligns well with Indigenous relational onto-epistemologies (cf. Hart, 2010; Smith, 2012; Kuokkanen, 2000; Wilson, 2008 & Kovach, 2010), the ambition to investigate socio-material entanglements and support emancipation (NLEC, 2020; Gourley et al., 2021), and utilise epistemic spaces for Sámi Indigenous efflorescence in all available contexts. As for availability, the reader has the power to decide whether to give room for the content, as I will show through epistemic logic (Chalmers, 2011) in the following section.

Is it epistemically possible for a relationally intertwined onto-epistemology?

There are many ways things might be, for all we know. The worldview captured in the quote by Wilson (2008) is one of those things. To evaluate whether there is epistemic space for this kind of relationally intertwined onto-epistemology, I have turned to epistemic logic (Chalmers, 2011). According to Chalmers, any epistemic possibility is available for an unknowing subject (ibid.). Knowing consequently delimits the epistemic space accordingly. When Chalmers (2011) approach the nature of epistemic space, he does this in a systematic, mathematical way. This brief account, however, is far from a complete understanding, but should be seen as a first attempt to

investigate whether epistemic logic can be of help when analysing the worldview in the quote. If so, epistemic logic could be a valuable tool when reimagining and creating a new social contract for education (UNESCO, 2021). Chalmers (2011) suggests that:

> When it is epistemically possible (for a subject) that p, there is an epistemically possible scenario (for that subject) in which p. A scenario is a maximally specific way things might be: a sort of epistemically possible world, in a loose and intuitive sense (Chalmers, 2011, p. 60).

To proceed any further we have to look closer at scenarios asking ourselves whether an epistemically possible scenario based on this onto-epistemology is available. There are several possible scenarios in an imaginative overarching epistemic space (ibid.). The two obvious ones in this example are that it is possible and the other that it is not. All scenarios that are not excluded by any a subject's knowledge are epistemically possible. However, we can simply not know, per se, whether this onto-epistemology is true or not and have to turn to beliefs (ibid.). Therefore, the scenario is "doxastically possible for a subject if and only if it is not doxastically ruled out by any of the subject's beliefs" (Chalmers, 2011, p. 61). Seen from the perspective of epistemic logic, only if the belief qualifies as knowledge, scenarios ruled out as doxastically impossible are also epistemically impossible. Consequently, it is (for some subjects due to their beliefs) onto-epistemologically possible that every individual thing (that subject) sees around (him/herself) is a huge knot where thousands and millions of relationships come together. Although this is a somewhat overly liberal conception of epistemic possibilities (ibid.), it is likewise an interesting thought experiment when trying to reimagine taken-for-granted truths.

Taking the experiment further, deep epistemic possibility provides further insight, i.e. "ways things might be, prior to what anyone knows" (Chalmers, 2011, p. 62). Three notions of how this can be understood are presented by Chalmers, one of which suggests that "every proposition that is not ruled out a priori is deeply epistemically possible" (ibid, p. 63). If the onto-epistemological idea is accepted, it results in beliefs and if justified it leads to knowledge. Further, the expression relation regulates how truth conditions are preserved and "the utterance is true if and only if the thought is true" (Chalmers, 2011, p. 66). Regarding the worldview in the assessed quote, it is deeply epistemically possible as it expresses a priori, potential knowledge that can be justified independent of experience, as long as the subject truly believes it is true.

The above analysis leads to the conclusion that it is epistemically possible with a relationally intertwined onto-epistemology as long as one beliefs that it is. If then, as is claimed in the second part of the quote, epistemology is identified as invisible, relational knots containing developing ideas, grand abstractions, entire systems of thinking, relationality as a key feature of both Indigenous ontology and epistemology needs to be further unpacked. This notion is supported by epistemic logic as shown in this part of the paper. At the least, it is not ruled out as an epistemic impossibility. Therefore, an analytical framework capturing and making visible relational aspects of a societal practice, such as education, is motivated. With this philosophical experiment, I encourage you to stay open to an onto-epistemology intertwined by relationality.

Four-dimensional relational framework

Resonance theory is a sociology of the world, where relationships between self and parts of world are understood and described through their resonating qualities. Rosa (2019) emphasises that it is a mode of relation rather than a state of mind. Before going into detail, some basic assumptions behind resonance theory are initially important to mention. Firstly, the process where subject and world encounter is in flux. Secondly, encounters between the experiencing subject and world can go both ways or happen simultaneously. A subject, such as a specific person, can intentionally look for resonant relationships when approaching the world as a place of attraction or repulsiveness (Rosa, 2019). In that case the subject plays first tuning fork, which has the potential of "setting off" other entities and create a resonant relationship. Reversely, parts of world, such as a piece of music or art, nature, other subjects or ideas can act as first tuning fork setting off a resonant reaction in the experiencing subject, as was mentioned earlier about texts. In both cases, the process is guided by strong evaluations, i.e. parts of the world identified as worth engaging in or interacting with, as they are capable of response. Further, Rosa (2019) assumes that modern subjectivities are driven by fear of losing out in competition and a desire to access, attend and make available parts of the world. Although some relationships are mute, those are also important as they allow us to consume parts of the world for our survival. Hence, muted relationships should not be perceived as the opposite of resonant relationships, but as a necessity for our survival as long as not too many of our relationships are muted (Rosa, 2019). When failing to establish mute and/or resonating relationships, alienation as the flipside might be the result. That is a state of being where we experience the world as cold, numb, deaf etc.

Rosa identifies four axes of resonance, where the relational quality stretches from mute to more or less resonating (ibid.). In this framework, I refer to them as dimensions.

- Self-dimension where self-efficacy and a strong identity are important features. It is about being in resonance with one's body, emotions and biography.
- Vertical dimension: representing existential resonance to abstract entities such as Ideologies, Religion, Spirituality, Nature, Universe etc.
- Horizontal dimension: representing resonance to people or groups of people, such as political parties, congregations, associations, neighbourhoods etc.
- Diagonal dimension: representing resonance to objects and the actions they afford in the sense of work, activities etc.

In the next part, I provide an example of when the framework is utilised as an analytical tool. Regarding the self-dimension, I will return to that in the concluding discussion as it provides an opportunity for reflexivity, an important aspect for relational accountability.

Analysis of Árbediehtu (Nordin Jonsson, 2010)

Through several re-readings, the analysis has ended up with numerous examples of relational aspects on vertical, horizontal and diagonal dimensions of resonance presented under separate headings below.

Vertical dimension of existential resonance

On the vertical dimension, abstract entities are presented, with a summary of how the policy suggests these issues should be perceived.

- *Nature* is described as an animated, living being, which should work as guidance when implementing the policy. By letting this view of nature permeate every societal structure a safe environment is created where long term sustainability for biological diversity is possible. The nature-animal-human relationship is the basis of árbediehtu (Sámi traditional knowledge).
- *Ethics* is highlighted as important when gathering, mediating, preserving and managing Sámi traditional knowledge. However, the local context and purpose of a project have to guide which parts of the policy guidelines are to be utilised and how to interpret the advices in the policy. Different relationships need to be established locally and agreements in place depending on what is planned. Agreements have to be put in place to protect from exploitation. For a smaller, practical project, there is no need to have a hearing with the local community or create agreements.
- *Honouring* those that have shared their knowledge is important and anonymity should therefore be avoided. If anyone involved wish to stay anonymous for different reasons that is also ok.
- *Other existential factors* of importance are that the ties between the past, the present and the future are indissoluble. Árbediehtu is not to be perceived as an opponent to scientific knowledge, but is to be respected as an equally valid way of gaining and doing knowledge. In Sámi knowledge tradition, there is no opposition between earthy/practical/material and the spiritual/immaterial nor empirical/objective with holy/intuitive. Religion, belief systems and ethics can be part of this work. Heterogeneity is perceived as a strength, where the adaptive character of árbediehtu is highlighted.
- Through this *holistic* worldview contextual factors should, if possible be described to such a large degree as possible.

Horizontal dimension of social resonance

- *Elders*, such as grandparents (áhkku and áddjá), should have a central position in the educational system.
- However, *all Sámi* carry both theoretical and practical traditional knowledge to different degrees depending on the contextual preconditions in a person's landscape/nature. *All Sámi* have a common responsibility to forward traditional knowledge.
- Sharing with the *community*, or *other interested people* is an important part of a project involving árbediehtu. Knowledge acquisition is emphasised as a *collective* endeavour.
- The policy document is aimed at the *politicians in the Sámi parliament, the staff working at the Sámi parliament, all Sámi, society at large,* for example *authoritative personnel, researchers, museums and others* that encounter Sámi traditional knowledge through their work.

- Additionally, the *reindeer herding community* or *other Sámi communities in a particular area, family and relatives* all contribute with codes, rules and regulations on how to behave in the life environment in that area.

Diagonal axes of material resonance and the actions afforded by objects

- To be able to *try oneself* and *observe* others in collaboration with elders in an authentic context is by far the best way of learning, according to the policy. One should learn to leave traces without destroying the landscape and natural resources.
- *Narratives* are also common when passing on traditional knowledge to future generations, through either storytelling or jojk, the traditional music.
- The policy as an object is supposed to *guide* different societal structures (museums, governmental offices, universities etc.) on how to deal with Sámi traditional knowledge. The policy is referring to another policy document, Eallinbiras (The Sámi Parliament, 2021), which is an action program on how to carefully, in a sustainable and long term way work with árbediehtu. Both policies complement each other.
- Traditional knowledge on how to *optimize harvestings from nature* and how we *manage the resources* we have are important.
- *Places for doings or sacred places* are highlighted as particularly important in-situ locations for árbediehtu. To visit such places, either by physically travelling to those locations, or virtually through movies or pictures is thus of great relevance when understanding árbediehtu.
- When in place, *identifying knowledge holders* within the field one wishes to learn more from is a key activity.
- *Collective symbols are to be respected* as common properties that cannot be individually owned.
- *Projects, thematic work, interviews and meetings* with traditional knowledge holders, often elders, are examples of activities one can engage in.
- *Making movies, books, sound books, articles, exhibitions, lectures* are also important in forwarding traditional knowledge, i.e. ex-situ preservation of traditional knowledge.
- *Language and traditional knowledge are intertwined*. By studying the language from an árbediehtu perspective, such features are manifested. *Writing down* what one knows and can about different things related to árbevirolaš máhttu (traditional doings and knowings) is emphasised as a collective Sámi responsibility.

Discussion

In this concluding discussion, I will further elaborate on what implications the findings from the above analysis might have on networked learning, and especially remote Sámi language education. An important notion, however, is that Wilson's (2008) quote indicates that entities concurrently are made of numerous entangled relationships, most likely on several of these dimensions, reminding that the division in this paper is purely theoretical. For this reason, I have chosen to enmesh the different dimensions in the discussion. I aspire an "as-well-as theoretical approach" (Bagga-Gupta et al., 2019: xii) where interrogations, negotiations and productive dialogue (Pesambili, 2021) opens up epistemic spaces that have largely been out of reach for Indigenous worldviews. The framework is helpful when "challenging established ways of thinking about education, knowledge and learning, and move towards a sustainable, desired future" (UNESCO, 2021) as it makes visible abstract relationships that are often treated as peripheral. As such, it is in alignment with ambitions within the Networked Learning community to support social justice and emancipation through "new theoretical configurations and practices" (Gourlay et al., 2021, p. 327).

The combination of a relationally intertwined onto-epistemology and resonance theory (Rosa, 2019) is helpful for identifying abstract relational entities in the vertical dimension, such as perceiving nature-human-animal as an inseparable holistic entity. Not only deeply philosophical, this kind of notion also adds to the picture of unsettled power relations (Gourlay et al., 2021) as relational hierarchies are thereby challenged. This is a counterpart to the dominating anthropocentric view, which allows for, according to Rosa, commodifying large parts of the world, making resonant relationships to nature harder to achieve. I agree with Rosa (2019) who claims that modern subjects have to run faster just to stay where they are, something he refers to as dynamic stabilization. For example, in order to keep our jobs, we need to deliver more and not just aim for status q. If accepting that human-nature-animal is an inseparable entity, we simply have to adopt a different attitude towards the world, something possible through an Indigenous relational approach but difficult to combine with dominant Western philosophies.

The horizontal dimension, however, have clear alignments with existing prominent theories, such as the expanded theory on Communities of Practice (Wenger, 2010). The policy describes árbediehtu, traditional knowledge as embedded in the Sámi languages, and manifested as practices often carried on from one generation to the next

through embodied action in real live settings. Messina Dahlberg & Bagga-Gupta (2016) refer to this as languaging, a dialogic approach where human actions and activities are given primacy in a similar manner as the example from Wenger. In this case, an as-well-as theoretical approach could be productive, as it encourages different theoretical negotiations, collaborations and dialogues offering theoretical proliferation.

Regarding the diagonal dimension, it deals with objects and the activities they afford as in work-related practices. The production of teaching aids, or what Säljö (2012) refers to as external memory systems, are lacking behind in Sámi society at large and in Sámi education (see for example Outakoski et al., 2018), although there has been an increasing number of digital resources in recent years (Cocq, 2017). Still, the teachers within remote Sámi language education largely have to trust their own creativity and ingenuity if pupils are to establish a resonant relationship to árbediehtu, traditional Sámi knowledge. Additionally, they might have to master tools that are "black-boxed" (Säljö, 2012) such as search engines, GPS navigators, spell and grammar checks etc. For example, GPS technology has been introduced in reindeer herding, which in combination with árbediehtu has proven to be an empowering combination (Kuoljok, 2019a; 2019b). The role of technologies in Indigenous language revitalisation sometimes have different purposes than in Western pedagogies, and the goal of the practice might differ (Meighan, 2021). When digital resources are produced within a Western framework, they risk at failing in supporting both the local needs of people (ibid.) as well as the development of digital literacy and hybrid minds (Säljö, 2012). Through this kind of multidimensional relational outlook I believe those risks are, if not vanished, but severely diminished.

Returning to the Future of Education initiative by UNESCO, what they aim at is a new social contract where we learn *how to become* in a sustainable way through the transformational power of education (UNESCO, 2021). This requires changes that are philosophical, social and practical in character. I believe the framework itself can work as an empowering tool for teachers when reimagining education and transferring their beliefs into lessons. Asking and answering relational questions is a reflexive practice with the potential of strengthening identity and the sense of self-efficacy. If taking myself as an example, the journey I embarked on, which I presented at the 12th Networked Learning conference in 2020, was connected to my own family history, which reveals the result of an aggressive assimilatory politics (Outakoski, et al., 2018) resulting in me partially losing my heritage language, north Sámi. I early on in the graduate process felt a need to prioritize a search for a suitable research identity (Parfa Koskinen, 2020b). Not only was I lucky to get the support from my supervisors when embarking on this journey, I have later understood that my sense of self-efficacy increased dramatically in a transformational way.

Concluding remarks

This paper describes a relational approach bridging actions/activities and cognition. This goes beyond literacy as a synonym for learning, and Säljö (2012) points out the importance of developing epistemic practices coordinated with the affordances of the advanced digital tools available. I believe a multidimensional relational analysis, as the one presented in this paper, is such an epistemic practice. The framework is flexible enough to be utilised as a single or additional tool for understanding and articulating relational aspects in a number of practices, something referred to as a boundary-object (Akkerman & Bakker, 2011). It can also be helpful when looking at many types of empirical material, such as interview transcripts, observational notes or recordings, focus group discussions, pictures, objects etc. As this is a first elaboration, the framework will continue developing but as of today, its intended use is when planning, evaluating or analysing educational practices and policies.

The analysis shows that the policy articulates relationships on three of the four dimensions in the framework. When engaging in árbediehtu projects, success can thus be measured through the transformational power of the included relationships, which in turn requires the establishment of resonant relationships on multiple dimensions. It is not enough to do something, such as handicraft, baking or visit cultural sites. According to resonance theory, the activity needs to result in resonance for it to be transformational, a process difficult to plan for, design or stage. However, learning has continuously eluded educationalists and researchers but still not stopped learning activities from being conducted. We keep trying and hoping for the best. What this paper suggests, is that we to a larger degree ask relational questions on multiple dimensions when trying to understand and facilitate learning and knowing.

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Interactive and action-oriented instruction for a digital era. A methodological reflection paper

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Abstract

This paper explores and reflects what the methodological considerations are for a study of classroom practice as networked learning. The area of interest is instruction in reading children´s literature in the primary school classroom, i.e., emergent literature didactics. Digitalization processes in society and school involve new conditions for literature didactics and challenges in the classroom. In today`s society we not only communicate in the form of speech and writing, but the digitalization has resulted in that communication takes place through both texts, images, and sound, i. e. multimodal communication (Jewitt, 2008; Godhe et al., 2020). Except for these changed conditions, it is possible to observe decreasing reading frequency, changing attitudes towards reading, and declining reading comprehension among children and youth in Sweden today (Statens Medieråd, 2017; Skolverket, 2017).

The overall aim of the PhD thesis is to contribute knowledge about how literature didactics is designed in primary school classrooms, with regards to how this instruction enables encounters with and comprehension of children's literature, through the support of digital technology.

The project consists of three empirical sub-studies with a mixed method approach. In combination with quantitative surveys, qualitative focused observations and interviews with teachers will target instruction in literature didactic, and the role and function of digital technology. Participants are pre- and in-service teachers.

The presentation of sub-study I describes how thirty-seven preservice teachers observed classroom teaching during one school day in different primary schools, with the aim to investigate activities related to fiction reading and the role of digital technology in these settings. The study was analyzed by using a thematic content analysis. The preliminary results show that dialogic reading, where the teacher reads fictions texts aloud and orchestrate a dialogue about it with the pupils, is dominating. The activity is supported by document cameras. In the context of this paper, the dialogic reading is understood as part of many pedagogical practices within networked learning, which includes interplays between teacher and pupils or between pupils. The results raise questions about teachers' motives for literature choices, design, activities, and uses of technology. The analytical tools used in the first study need to be improved, in order to gain a better understanding of the role and function of technology in reading instruction in primary school settings. In addition, complementary empirical data with different foci need to be collected and contrasted with the empirical results from sub-study I.

Keywords

Literature didactics, reading instruction, dialogic reading, digital interaction, primary school, networked learning

Introduction

This paper is a reflection on methodological considerations of a PhD thesis project in progress.

The thesis area of interest is instruction in reading children`s literature in the primary school classroom. Reading and writing in these grades extend from the initial reading and writing instruction, where pupils must learn the connection between letter and sound, understand what they read, write letters, and gradually continued reading and writing instruction where reading fluency and writing are developed. The overall expectation of emergent literature didactics is that pupils are given the opportunity to participate in various reading and writing practices. More precisely, pupils should be offered possibilities to encounter and experience children`s literature in meaningful ways, with the aim to improve their comprehension of its content.

Digitalization processes in society and school involve new conditions and challenges for literature didactics in the classroom. Media and technology developments entail that reading habits, frequencies, competences, attitudes, and choices are changing. In today`s society we not only communicate in the form of speech and writing, but the digitalization has resulted in that communication takes place through both texts, images, and sound, i. e. multimodal communication (Jewitt, 2008; Godhe et al., 2020). Digital technologies have increased opportunities and means of communication, for example by creating and sharing sound, image, and film (Sofkova Hashemi et al., 2019). These conditions for reading and writing are partly considered in the Swedish school`s steering documents, such as in the syllabus for Swedish, through formulations in both the purpose and the central content. For example, it is stated that pupils should have opportunities to communicate in different digital environments with interactive and changing texts, and that pupils should encounter texts that combine words and images, as well as texts in digital environments (Skolverket, 2022).

The impact of digital developments on text and reading results in implications for literature didactics and teachers` practice. In a changing text world where technological development is constantly changing the conditions, it becomes important to investigate how teachers work practically to give pupils the opportunity to encounter, experience and understand fiction.

Regarding the changed conditions for text production and communication, it is possible to observe decreasing reading frequency, changing attitudes towards reading, and a deteriorating reading comprehension among children and youth in Sweden today. According to a survey from Statens Medieråd (2019) an increasing number of children rarely or never read books in their spare time. The daily reading is most common before school age. Thereafter, it decreases with increasing age. Swedish children and young people are also more negative towards reading than other comparable countries (Skolverket, 2017). The ability to read, which in this paper refers to reading comprehension and the ability to understand text, has decreased among Swedish pupils during the 2000s. This emerges most clearly in recent years' PIRLS results (Progress in International Reading Literacy Study). PIRLS is an international study of reading comprehension among 9–10-year-old children in which Sweden regularly participates (Skolverket, 2017).

This overview raises questions about what fiction is in Swedish primary school classrooms today, and how teachers work with fiction and the role and function of digital technology in these settings. Research in the field of reading instruction and digital resources in primary school is limited and points to the need for investigating how digital technology is introduced into literature instruction, so that basic reading skills and -comprehension are supported for further reading ability and reading development in a digitalized world.

Emergent literature didactics needs to include activities that focus on encounters with the text, which include instruction that enables personal reading experiences, reading engagement and personal interpretations (Rosenblatt, 2002). This dimension focuses on the creative, spontaneous, and emotional aspects of fiction (Culler, 1991). A second dimension of reading, which needs to be considered in how the instruction is designed is comprehension, where pupils are given the opportunity to analyze the text (Rosenblatt, 2002). The combination of engaged encounters and comprehension training provide good opportunities to develop pupils` reading skills.

A present risk with ongoing steering and investment initiatives with regards to teachers' digital competences, is that technology will be the goal, and not the means for staging the above-mentioned aspects of reading instruction. The activities that are designed in the classroom should therefore be based on the syllabus´ learning goals and course content and not primarily focus on whether they are digital or not (Lederman & Neiss, 2000). The uses of technology should be justified in relation to what is going to be learnt and how.

The overall aim of the thesis is therefore to contribute knowledge about how literature didactics is designed in primary school classrooms, with regards to how this instruction enables encounters with and comprehension of children's literature, and how this instruction is and can be supported by digital technology. Which digital technology and resources become relevant in these contexts and how is it incorporated in meaningful ways into classroom activities with a focus on fiction reading? This overall question has been broken down into the following research questions, which are directed at networked learning in classrooms:

- What interactions, with and without digital technology, are identified in different primary school classrooms through instruction related to fiction reading?
- What roles and functions do digital technology have in the interactions related to fiction reading in primary school classrooms?

Practitioner should in the present thesis be understood as the different classroom practices which teachers and pupils regularly engage in. The classroom practice in turn consists of various activities. These activities include participants' sayings and doings and are designed by the teacher. The teacher decides, for example, whether the activities are carried out individually or in groups. Group activities consist of interactions, which include interplay between teacher and pupils or between pupils, which is an aspect of networked learning. Digitalization inevitably means that teachers' practices with fiction will change. Cerratto Pargman and Jahnke (2019) describe how digital technology can intervene, support and change practices in school contexts. These practices can also disappear and then be replaced or reinforced by new practices.

Methodology

The project is a compilation thesis initiated by a pilot study, followed by three sub-studies. The project combines qualitative and quantitative data collection method. The first study is based on qualitative focused observations and the second on qualitative focused observations and interviews, followed by a third study comprising of a quantitative survey.

By combining quantitative and qualitative approaches, the ambition is that to obtain complementary data that can provide a more accurate and adequate understanding (Coe et al., 2017) of how teachers design their literature didactics related to fiction and what role and function digital technologies are assigned in these settings.

The aim of a mixed method approach is to ensure the validity of the project as a whole and to draw conclusions that can be generalized in valid ways. If different methods provide data that are consistent with each other, this can enhance strength and validity to the research (Coe et al., 2017). For the present project, the quantitative survey will hopefully contribute to a more general view of how teachers` design their reading instruction related to fiction and the role and function digital technologies are assigned in these settings. This type of triangulation characterizes the mixed method perspective as a research approach (Coe et al., 2017) and serves the purpose – to investigate interactions with digital technology and the role and function of technology in the classroom from different angles.

The mixed methods in my project are applied within an exploratory design, which means that the qualitative phase comes first, serving the objective to carefully explore the problem (Coe et al., 2017). In the present project this consists of exploring i) which fiction is circulating in primary school classrooms of today, ii) what becomes visible and what is invisible or considered exceptions, iii) how do teachers design their instruction related to fiction with regards to the role and function of digital technology and, iv) what are the practices that emerge? Thereafter the quantitative phase follows, which aim is to verify patterns and observations from the qualitative studies in a broader sense. A quantitative approach also aims to confirm whether the results from the observations and the interviews are supported by the survey (Coe et al., 2017; Denscombe, 2018). The sequential combination is thus QUAL-QUAN.

Study	Methods of data collection	Methods of analysis	Participants	Content
I	Observations, in 37 primary school classrooms	Thematic analysis	Pre-service teachers	Investigate what kind of activities related to fiction reading appears in teachers` instruction and the role of digital technology in this.
II	Focused observations & semi-structured interviews	Thematic analysis	Teachers	Investigate how teachers through dialogic reading give pupils the opportunity to encounter with the text and how the teachers organize activities after the dialogic reading.
III	Surveys		Teachers	Questions about fiction and instruction related to fiction.

Table 1: Overview of the studies

Participants

The participants in the project are pre-service teachers and teachers. The rationale of this choice to focus on teachers and not children`s actual encounters with the text, stems from my interest in the activities in the classroom and how teachers design their practices related to fiction.

In the pilot study, nine teachers were interviewed based on a convenience sampling. In sub-study I, the participants were pre-service teachers from a Swedish course in the teacher education where I was one of the teachers. The pre-service teachers conducted observations of different classroom activities as an assignment within the course. In total, they observed 37 classrooms, which offered access to a wide range of instructional settings and practices in a short period of time, while including pre-service teachers in research activities. The study reveals both how pre-service teachers engage with a predesigned data collection, and what is going on in a variety of classroom settings according to the students.

Prior to sub-study II, contact will be made with schools and teachers with the purpose to select two schools and two teachers at each school, to observe and interview. The selection of the teachers is based on a purposive sample, which, according to Bryman (2018), means that the participants are selected strategically, as they should have a connection to the research questions formulated. A purposive selection can consist of several criteria (Bryman, 2018), which in this case can relate to the school and the teachers' digital competence, which I will consider. As the study includes digital technology, the chosen school should be equipped with a certain amount of that. The principals will be asked about the amount of technology in the classrooms. My previous workplaces are also excluded because of the risk that my interpretations are affected by my experiences from there.

Regarding the sample of the survey, the ambition is as described above that the respondents should consist of a representative sample of the population. In this case, the population consists of teachers in primary school. In order to obtain a sample that is representative of the population, a cluster sampling should be taken, and the selection technique should be based on randomness.

Observations

The qualitative part of the project, sub-study I and II, includes observations. The observations are focused in such a way that specific activities related to fiction are investigated. Focused observations are used when a field under investigation focuses on a specific area of inquiry (Fusch et al., 2017). In observations, the researcher observes people, talk to them about what they do and what they think. The intent is to understand how they perceive different phenomena (Silverman, 2015; Baker, 2006; Seale, 2004; Fusch et al., 2017). According to the present thesis the intent is to understand the motives for specific literature choices, design, and practices within the classroom as well as which technology and digital resources that are integrated in the teaching. The observations will be documented using an observation template and through video recording. The conversations will be documented through note-taking.

Qualitative interviews

After the classroom observations, interviews with teachers will be conducted. The aim of the interviews is to deepen the understanding of the practice and examine teachers' rationales regarding why they do as they do.

When the purpose is to gain as rich and deep information about individuals' perceptions of different phenomena as possible, the interview is appropriate, according to DiCicco-Bloom and Crabtree (2006). Through this method, the researcher not only gains insight into teachers' reflections, beliefs, values, and emotions, but also contributes to raising awareness among teachers about their everyday doings in the classroom. In my project, the observations and the interviews are therefore connected and the interviews with the teachers will be conducted directly after the observations, to be able to ask questions about their recently completed classroom practice and their perceptions of it.

The interviews will be semi-structured with a set of predetermined open-ended questions. The process in a semi-structured interview requires flexibility, where the order of the questions can vary and other questions can emerge from the dialogue between interviewer and interviewees (DiCicco-Bloom & Crabtree, 2006). The interviewee`s perceptions and interpretations of questions and phenomena must therefore be in focus (Bryman, 2018), which in this project consists of the teacher's perceptions of what fiction is, their literature didactics related to fiction and what role and function digital technologies are assigned in these settings.

Surveys

By using surveys in the present project, the aim is to get a broader picture of what emerged in the qualitative stage. The patterns from previous results, such as, similarities and differences, will be subject to further questions regarding design and practices with digital tools in the primary school classroom where fiction is in focus. A survey can therefore confirm and deepen the understanding of specific results from the previous studies.

Surveys can be used for several categories of rationales, specifically where there is a need to establish a general pattern across a large group of people, i.e. a population. To be able to describe the population, a survey can be designed based on a representative sample of that population (Coe et al., 2017).

Surveys usually include a relatively large drop-out rate, i.e., there are no answers from a majority of the respondents. If there is a large drop-out rate, the results risk to be skewed, which means that data from those who answer the survey differ from the answers of those who did not take the survey. This in turn means that there is a risk that the sample will not be representative of the population (Bryman, 2018). A key question should therefore be how to avoid as large dropout as possible.

The survey will include questions about fiction and instruction related to fiction. It has been shown that the drop-out rate increases with surveys by post (Bryman, 2018), therefore the survey will be digital, and the plan is that the respondents are receiving it by e-mail. In order to get in contact with respondents, I will make use of my professional network which include the university context and the schools for internship. The education administration of the municipality can also be helpful. An alternative is to distribute the surveys at competence development days, as many teachers participate.

Preliminary results and analysis

At this initial stage, one study with pre-service teachers has been conducted. There were thirty-seven pre-service teachers who made observations of classroom teaching during one school day in different primary schools, with the aim to investigate activities related to fiction reading that appear in teachers` instruction and the role of digital technology in these settings. The study was analyzed by using a thematic content analysis.

This method of analysis will be used in other observations and interviews in the project too. Thematic content analysis is used to scientifically analyze documents and texts of various categories. The analysis involves searches for underlying themes, or categories, in the data (Silverman, 2015). In sub-study I, six overall categories emerged.

Furthermore, the thematic content analysis will be used to categorize teachers' activities and perceptions of teaching fiction with and without digital technology. These categories should be continuously re-examined and revised during the analysis process (Bryman, 2018). Bryman (2018) describes it as an iterative process with a movement back and forth between categorization and data collection.

The underlying themes that the researcher is looking for are described by Denscombe (2018) as unconscious messages that are communicated in the text. In my project, there may be unconscious messages that appear in the teachers' statements about their view of literature didactics and the role and function of the digital technology in the didactic practices. The thematic content analysis therefore aims how to cluster these sayings into meaningful categories.

The thematic content analysis partly has a quantitative approach because, with the categorization, it investigates the occurrences of a phenomenon (Denscombe, 2018). Another strength of the thematic content analysis is that it can be repeated by others, which contributes to credibility (Silverman, 2015).

The preliminary result of the first study indicates that the reading activities related to fiction are designed individually or in the whole class. Individual reading in this context means when pupils read printed fiction in a book by themselves. The shared reading in the whole class is either read-aloud from a printed fiction book or a textbook supported by a document camera. Audiobooks are used on occasions in the whole class reading. The results also show that teachers organize activities after the reading, such as writing or aesthetic forms of expression, which are all analogues. Some of the teachers also organize activities, analogue or digital, that promote reading, such as different forms av reading challenges.

Thus, the results show that shared fiction reading is dominant in the classrooms. The shared reading comprises of the teacher reading the text and having a dialogue with the pupils about it, which is called dialogic reading in research about literature didactics. The focus of dialogue in the reading is related to networked learning. The focus of the dialogues in the sub-study was reading comprehension. The result also implies that printed books dominate, although usually in combination with a document camera. A document camera is a form of digital presenter or visualizer. It can project the image of each page in the book that is being read. The document camera is used in reading and during the dialogue. Therefore, it supports the dialogic reading by visualizing images and texts large enough for all pupils to see, not only the teacher. This enables for teachers to work explicitly with texts and images, for example when they are modeling strategies for comprehension. This entails that the activities with a document camera integrated make the fiction accessible for all pupils.

The network learning setting dialogic reading is thus dominant in the observed classrooms. Research has shown that dialogic reading has a positive impact on pupils' comprehension and reading engagement. First, the dialogic reading gives teachers good opportunities to include instruction in reading comprehension, by introducing and modeling strategies for comprehension which can support pupils' active reading (Palinscar & Brown, 1984).

Second, when pupils are given ample opportunities to socially interact with others, as in dialogic reading, it supports motivation to read. Social interaction includes talking about books with others, reading together with others, borrowing and sharing books with others and sharing writing about books with others (Gambrell, 2011).

In summary, the results shows that dialogic reading supported by a document camera is dominating in the primary classrooms observed. The number of classroom (37) within which it occurs, supports the conclusion that this technology is integrated within established practices for reading instruction and literature didactics in Swedish primary school classrooms.

Reflections of the method

The result from sub-study I has formed an overview of activities, digital technology and established practices in the primary school teacher’s classroom. But it is a fragmentary picture, which rather results in more questions. There is a lot we still do not know, for example the motives for the literature choices, design and activities. A deepened understanding of the results from the first study is needed. Hopefully future focused observations, together with interviews can contribute to that. The survey can further deepen the understanding.

Both the observations and the qualitative interviews are depending on the interpretations of the researcher. Our background and experiences affect our interpretations of what we see and in qualitative research this becomes especially important to take into consideration, as this affects the reliability (Silverman, 2015; Denscombe, 2018). I have my background in the teaching profession, where I was active for nearly ten years before I began my doctoral studies. I feel at home in the classroom practice and have extensive experience of it. Hammersley and Atkinson (2007) states that experiences from the context to be studied, can contribute to an understanding of its historical and cultural context. In a school context my experiences therefore can contribute but also be an obstacle, since I might be taking things for granted and therefore not perceive the complexity in the different situations that will occur. Reflexivity is therefore an important issue during the whole project (Bryman, 2018).

One critique that is levelled against qualitative research is that of researcher bias. To address this issue, the data collection and the analysis will be described in detail (Coe et al. 2017). The fact that several data collection methods are used in the project should increase the credibility (Baker, 2006) as well as the templates used for interviews and observations.

During the planning for the survey, a key issue is skewness and how to handle that. The design of the survey affects how large the drop-out rate will be, so therefore considerations about the survey's layout, number of questions, the questions formulation and its order will be relevant issues to consider (Bryman, 2018).

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SYMPOSIUM 2

Models for hybrid higher education: Lifelong learning initiatives in the postdigital era

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Introduction

Initiating lifelong learning has been a task higher education has worked with for many years (e.g., Biesta, 2011; Knapper & Cropley, 2000). Politically, lifelong learning is emphasised as an tool to develop and nurture human capital and foster social development. The purpose behind many of these initiatives is to make people employable. However, higher education also works with lifelong learning initiatives to offer people democratic and humanistic values. Since the second half of the 20th century, higher education institutions apply these two perspectives (Jaldemark, 2021). In this symposium, the focus is on initiatives closely linked to the needs of the working market. Democratic and humanistic initiatives and perspectives are important but are here deemphasised. Whatever perspective is chosen, lifelong learning as an idea and task for higher education is still an emerging phenomenon.

The ongoing digitalisation of society impacts lifelong learning initiatives in at least two different ways. First, the digitalisation of society impacts human practises in many areas of life (e.g., Billet, 2021, Goodyear, 2021; Poquet & de Laat, 2021). For example, peoples' performance of everyday tasks such as communicating with friends and families or paying bills. In line with the focus of this symposium, the digitalisation of society impact work-related practices and tasks hugely. Some practices and tasks met slightly digitised changes; some disappear in the process. Some professions have disappeared, new ones have turned up in the footsteps of the increasing digitalisation of working life. These changes have led to an increased need for lifelong learning opportunities. Higher education institutions are seen as important providers to meet up these needs.

Second, digitalisation impacts the deliverance of education (e.g., Lock, Lakhal, Cleveland-Innes, Arancibia, Dell & De Silva, 2021; Sannino, Engeström, & Jokinen, 2021). Lifelong learning initiatives adopt digital practices to deliver highly accessible quality learning opportunities. Nevertheless, the link between higher education, application of educational technologies and lifelong learning is established long before the strong impact of the current digital technologies. Since its inception, distance educational settings have been a vehicle to enable higher education lifelong learning for adults. In effect, such settings predate the digitalisation of society while nurturing lifelong learning is a reason behind the introduction of these distance educational settings. Multi-functional digital technologies replace analogue technologies.

Until recently, Swedish lifelong learning initiatives were a voluntary task for higher education institutions. In 2021, Swedish legislators added to The Swedish Higher Education Act (Sveriges Riksdag, 2021:317/1992:1434) that "in their operations, higher education institutions must promote lifelong learning". In other words, the promotion of lifelong learning is nowadays mandatory for Swedish higher education institutions. This symposium includes six papers that discuss lifelong learning initiatives from one Swedish higher education institution, Mid Sweden University. It presents preliminary results from ongoing work at five development projects. These projects link to a university-wide development called BLAD (Jaldemark & Bång, 2020). In common for these projects, they all aim to develop networked and hybrid lifelong learning models suitable for higher educations alignment with the postdigital era.

The projects and studies

The first project called IPROF focuses on developing courses for professionals within the field of computer and electrical engineering. The author presents a model for creating customised and flexible courses at the advanced level. The work departs from a teacher perspective that includes building on the needs of working professionals with a flipped classroom and micro-learning pedagogy. Preliminary, the courses create win-win possibilities for the working professionals and their companies. Finally, experiences of and lessons learnt from participating in the courses link to future development.

The second project, called HÄLSOKOLL, is represented by two papers that focus on the health care sector. This project builds opportunities for lifelong learning for health care staff. The authors analyse and discuss the developed model from two perspectives: students and teachers. The first paper focuses on teachers' experiences of creating and distributing short, flexible and networked higher education courses to support health care workers' lifelong learning. The paper emphasises challenges in course design. The second paper of the project focuses on

the participants; in effect nurses and their experiences of participating in flexible networked courses. It describes and explores the nurses' experiences before and after participating in a higher education lifelong learning initiative.

The third project is a long-term university-wide project called HEaD that explores networked learning as a vehicle to develop a tentative model for sustainable pedagogical competence development for higher education teachers. The model aims at developing teachers' capacities to apply lifelong learning and technology-enhanced learning in higher education courses. The paper focuses on identifying key components of an educational development project for technology-enhanced learning. Moreover, it discusses how such organisation of the project may lead to sustainability in the regular university operations. The paper also discusses how a project for educational development can create over-time durable infrastructures, organization, policy and motivation for maintaining a continual educational development.

The fourth project DIGIFLEX works within the field of communication science. It aims to develop a model for flexible courses. The paper describes and discusses the design process consisting of three stages and two iterative feedback loops. The design process includes try-outs with a pilot course and feedback from students, teachers and a networked learning reference group. Through this process, the design evolved. The study guides the reader through the process and discusses implications of earlier stages for future development.

The fifth project works with designs for networked learning in environmental impact assessment (IA). The paper explores and analyses current teaching in IA in Sweden to develop this field through influence from other disciplines, in this case, networked learning. The study embraces two analyses of the empirical data. The first analysis includes environmental assessment courses for working lifelong learners; i.e., environmental impact assessment and strategic environmental assessment in Sweden. The second analysis links the International Association for Impact Assessment best practice principles and design dimensions for networked learning.

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An education model for customized and flexible networked learning courses for working engineers

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Abstract

The area of computer and electrical engineering is under constant evolution which leads to lifelong learning being an important aspect for being a long term successful working professional. This work presents an education model for creating customized and flexible courses at advanced level for these working professionals. We have approached this work from the educator's point of view and the focus will be on the teaching model and our results from implementing the model during the last two years. Including how we created these need and trend-based education offerings, the course execution inspired with micro-learning and flipped-classroom pedagogics, and our work with creating win-win possibilities within the courses for the working professionals and the companies they work for. Finally, we will present our experiences and lessons learnt, ending with a plan for our upcoming courses and our refined model in our ongoing future work.

Keywords

Engineers, Expert competence, Further education, IoT, ML, Lifelong learning, Working professionals

Introduction

There is a need for lifelong learning and continual professional development in almost all fields of work, and especially in engineering sciences where the technological trends rapidly develop (Guest, 2006). This type of lifelong learning also opens up our universities to a new type of students, that is students which already have an undergraduate degree but are looking to either up-skill or re-skill themselves. But courses aimed for lifelong learning also requires new ways of thinking in regard to the participants backgrounds, previous experiences, the applied pedagogics, didactics, and overall course design (Field, 2000). In which Networked learning (Gourlay, et al., 2021) and the research within is one key aspects for this to be successful in the long term (Goodyear, et al., 2004).

This article will present our work on this in the project IoT Professionals (IPROF) project that has been funded by the Swedish Knowledge Foundation's Graduate Professional Development program, which is a program that finances advanced level education for working professionals. As an effort to give universities support to give courses aimed for lifelong learning of currently working individuals. Within the project, we have chosen to focus on courses in typical computer and electrical engineering domains under fast evolution, namely the Internet of Things (IoT), Industrial IoT (IIoT), and machine learning (ML) domains, as well as related areas such as security. We chose this particular focus because of our research profile and cutting-edge expertise in these, and because of our large number of researchers in the areas. As well as it is where we have found the need for lifelong learning to be the most needed by our research partners.

The ambition of the project was to contribute to the industrial transformation using these new technologies and data-driven research and development to increase innovation, digitalization and strengthen the competitiveness of both the companies and the course participants. In this, we joined forces with five partner companies in the project, in order to together form and develop specialized courses based on the industry’s needs, demands, and the working conditions of the working professionals and their employers. This work also became extra important during the COVID-19 pandemic as a wave of layoffs and decreasing economy, created a more difficult labor market for engineers and computer/electro-technicians. Which is why the original two-year project also got extended with additional pandemic related funding, which enabled us to give even more courses than originally planned.

The problem and major challenge of this work was to develop an education and pedagogical model for giving courses to working professional engineers in the computer/electrical engineering domains. Including both the work to determine which specific topics we should focus on and which specific courses to give. As well as the creation of relevant course materials and the education work with giving these courses to working professionals and their unusual study situations. Including identification and overcoming many obstacles along the way, such as university administrative, pedagogical, and didactical challenges. However, we will focus on these two questions in this article:

1. Which are the most vital components in a networked lifelong learning model, specifically aimed for working engineers and their companies?
2. How can higher education courses for working engineers be pedagogically and didactically designed to support networked lifelong learning?

Based on the overall problem and these questions, we have chosen to focus this work on the teacher's perspective and using design-based research approaches (Barab & Squire, 2004). Design-based research was a good fit for this project, since it allowed us to focus on creating learnings from the development of useful tools and teaching methodologies. As well as enables us to include the contextual situation of our students in the research, as well as studying our lessons learnt in this teaching context. Our primary contribution in this article is therefore on our implemented model and course structure which is adapted for working professionals and our evaluation thereof. Including our reflections and plan for future courses within this concept and our refinement of the model. The remainder of this article is organized as follows: We start by presenting our approach and education model in detail. To then present our results from the model, followed by our learnings and reflections. Ending with our refined approach, future work, and conclusions.

Model

Early on, we decided to develop our model with the following leading keyword in mind:

- Need and trend-based education offerings
- Up-skilling and Re-skilling (Taylor et al., 2021)
- Micro-learning (Jomah et al., 2016) and flipped classroom (Lage et al., 2000)
- Flexibility both in time and place (Collis, 2002)
- Win-Win possibilities (Nørgård et al. 2019)

What these means for us, is that we started by inventorying the needs and trends of a number of partner companies to get an idea of which courses they think their employees should study in order to further their education, i.e., up-skilling or what they should focus on to reach new customers/opportunities i.e. re-skilling (Taylor et al., 2021). As well as creating opportunities for company-related project work and laboratory sessions that the professionals can see a double benefit from doing, both in the course and in their regular work situation (Fuller & Unwin, 2004). Another double benefit was that we could use these courses for promoting our own research and finding new industry partners, which was important for the longevity of the courses. The pedagogy was inspired by microlearning (Jomah et al., 2016) and flipped classroom (Lage et al., 2000). Meaning that we offered small portion sizes in our courses, divided so you can take part of the parts you want, according to the need you have. And that the pedagogy and didactics in the courses are largely based on self-learning, information gathering, own laboratory work, to then discuss and present to each other. In even more concrete terms, the approach has been to create small courses at a low pace (3 ECTS credits in 10 weeks), completely on distance with high flexibility both in time and place (Dirckinck-Holmfeld, 2009). These courses were free of charge as all university courses are in Sweden (even for professionals) since they were given as a part of our regular course offerings. An overview of our order of work and work process in the model can be seen in Figure 1. Which gives details on the steps and milestones we have set up at our university that need to be taken in order to give each course. This process overview also highlights which of these steps that only need to be taken once upon course creation and which steps that need to be repeated for each time a course should be given.

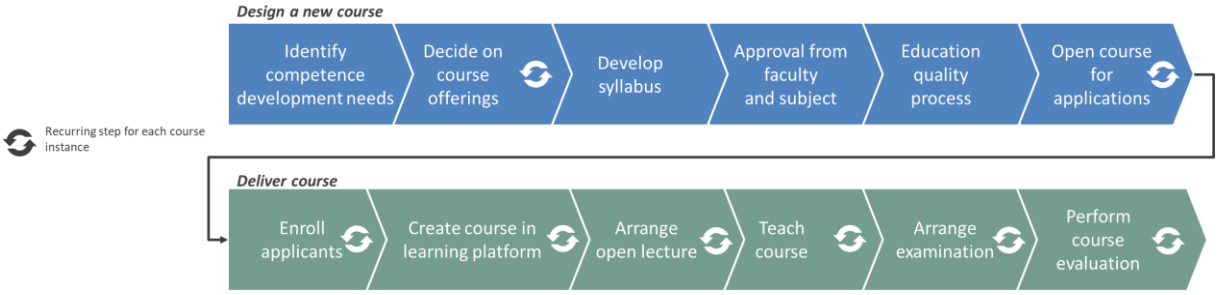

Figure 1. Our working process steps for each course

A more general and illustrative overview our education model and course execution from the educator's point of view can be seen in Figure 1. Which highlights the overall steps of inventory, development, course execution, and finally evaluation. This figure will be used as a guide for the remainder of this section, in which we will go deeper into each of these parts and explain them more in detail.

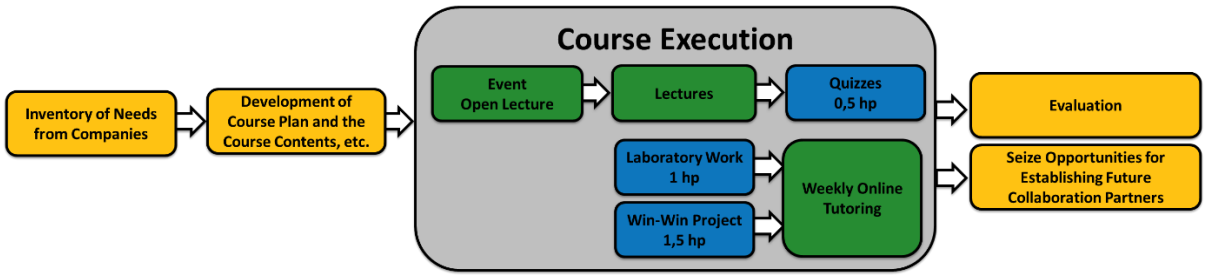

Figure 2: Overview of our general education model aimed at working professionals

Inventory and development

The work started with an inventory of the needs of the broad computer/electrical engineering industry. In which we interviewed our five closest partners within the project to get an overall view of their general needs. This was carried out with a series of interviews akin to semi-structured focus groups (Galletta, 2013), in which we discussed certain aspects of the upcoming courses. Both in form, the target group, their specific company needs, and the specific technological topics to focus on. After each interview, each company was given the task of creating their own wish-list of their most interesting topics that they think we should give our courses in. To help them in this work, we created an overview figure (see Figure 3) with a comprehensive list of potential technologies that are within our expertise area that we could fit within the project.

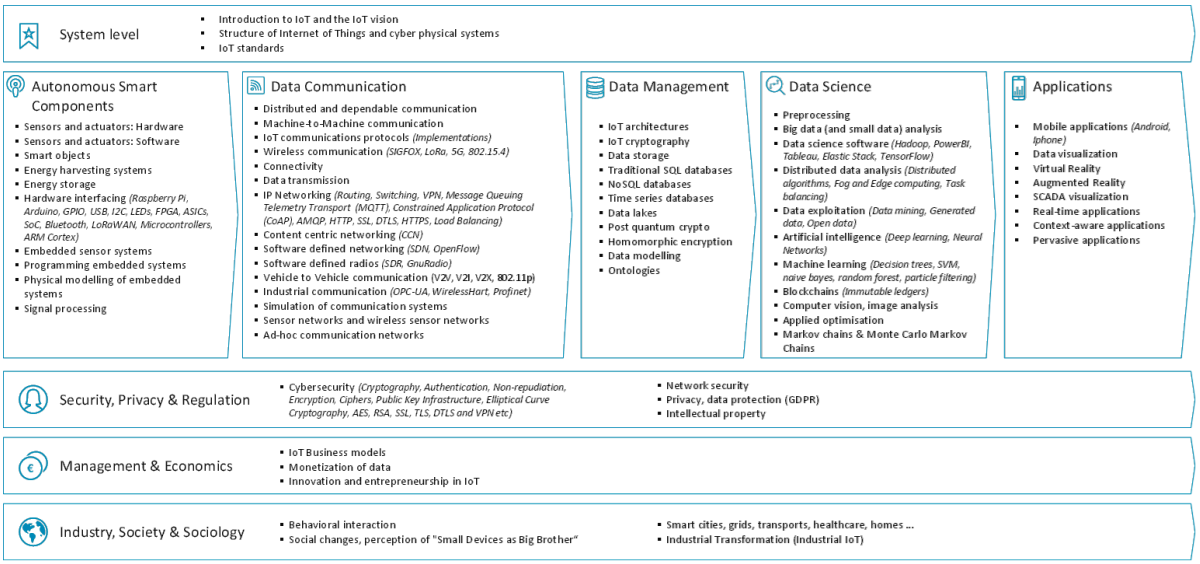

Figure 3: Technology list used in the inventory with industry partners

After the initial inventory with the industry partners, we had enough information to discuss and decide which courses we were to begin with. Once the decisions were made, we performed a series of workshops with the same partner companies to get their input for creating relevant expected learning outcomes, prerequisites, course contents, etc. for the syllabuses. The intended course responsible teachers led these workshops, which also included shortly presenting relevant background theory on Bloom's taxonomy (Bloom, 1956), the SOLO taxonomy (Biggs & Collis, 2014), constructive course alignment (Biggs, 1996) and the usage of the right verbs in syllabuses (Anderson et al., 2001), all in order to be able to get the most relevant feedback from the partner companies. After the workshops, the syllabuses were handed off to the university's internal syllabus quality review process, which has to have been carried out before the courses can be formally announced and given.

Course execution

Early on, we decided that these courses should not only be just for the formally enrolled students. We wanted to reach a larger audience and support lifelong learning for everyone and anyone that could interested in the topics of the courses. Even if they, for example, did not formally meet the course prerequisites of these advanced level courses. Therefore, we chose to start each course with a live-streamed open lecture that was open and freely available for anyone who wanted to learn more about the field. In this way, we also reached out to professionals who did not have time to take on a full course. We could also use this open lecture as a recruitment event to get more students to enroll. Since the course was open for late enrolment up to two weeks after the open lecture, and this open lecture was the first introductory lecture in the regular execution of the course. We also made a large effort in the marketing for this open lecture, sharing the event on all our social media channels, newsletters, to our research partners, etc.

In our education model, we chose to also stream the subsequent regular lectures and give them live, but not publicly. While at the same time record them so that the students who could not participate live still could take the course and take part in the material. Furthermore, in order to save on the teacher's time and resources each lecture also had an online quiz attached to it to ensure that the students had absorbed the material and so that they themselves could test their own understanding. In these quizzes, we applied a simple approach that forced the students to get all answers correct in order to pass, but they could retry as many times as they wanted without penalty. Most engineering courses also have practical laboratory sessions as an effective pedagogical tool to practice the student's engineering skills and techniques. But because the courses in our model were to be given on distance, these practical laboratory sessions had to be adapted so that they can run them on their own home or work computers without special equipment. All laboratory sessions were examined using oral presentations that were managed by screen-sharing, where the students showed their code and presented their work. Furthermore, all the lectures, quizzes, and laboratory sessions had to be encapsulated into suitable micro learning sizes for the working professionals to take on the tasks when it best fit their own work and life situations.

In order to support more networked learning aspects, we have also had weekly scheduled occasions where the teachers were available online for questions, presentation, and discussion about the laboratory tasks, as well as project supervision. These occasions were also used as opportunities for the students to discuss live and share experiences in the course, the laboratory sessions, and problems in their regular operations as working professionals. Each course also ended with a project assignment with case-based learning (Savery, 2015), where students had great freedom of choice, in the exact focus of their projects. All in order for them to be able to adapt the focus in their own learning to create win-win opportunities for themselves in their work and their lifelong learning.

Evaluation and future partners

Both during and especially after each course we had to evaluate the course contents, the level of the quiz questions, the laboratory tasks, and the overall progression within the course for the students. For the formative evaluations we had the weekly student meetings and course forums to reach the students and collect their feedback. But after the course, we both made short interviews with the students on their last session when they presented their final project, as well as a formal standardized written course evaluation form sent out to the students after each course has ended.

However, one especially important goal for us to give these courses was to establish new research partners, find new potential research projects, and find partners for future funding. Because of this, the teachers were given the task of collecting key information regarding the students work situation, their employers, and potential for future

collaborations. This information was collected both in one of the first tasks the students were given, where they should introduce themselves to each other, but also in the weekly discussion sessions. Finally, it was up to research leaders together with the particular teachers in each course, to take these potential new connections to the next level inside the research environment.

Results

As a whole we see our education model and the courses given as highly successful, since we have successfully passed over 25 working professional students using it. We have also managed to spread knowledge to a large audience beyond the enrolled students. Since we have had a substantial number of views at the open lectures, which have been shown an average of 300 times per lecture and course. However, some improvements in our model has been identified. When it comes to the courses themselves, we have had an average of 8 active participants per course. However, the throughput has been low, which we have analyzed and evaluated to be due to the fact that many professionals have been mostly interested in gaining relevant knowledge and getting access to good course material and not the ECDT credits per se. Which means that many have chosen not to complete the last project that involves report writing and oral presentation for grading and examination. But we can observe that the overall participation in the online quizzes, lectures, and laboratory sessions has been in line with other distance courses. Hence, we have determined that it primarily was the final project which lowered the student throughput. A list of all courses given with our model and their throughput can be seen in Table 1.

	Applicants	Participants	Passed
Applied machine learning (2020), 3 ECTS	150	28	5
Applied machine learning (2021), 3 ECTS	86	19	7
Internet of Things-protocols, 3 ECTS	59	6	2
5G technologies, 3 ECTS	46	6	1
Effects and strategies in IoT, 3 ECTS	42	22	12
Introduction to IoT-nodes, 3 ECTS	38	13	0
Applied network security, 3 ECTS	66	10	1

Table 1: Course listing and results

Another important aspect which was noted during the post course evaluations of these courses was the low conversion rate from applicants to enrolment. Meaning that out of the 487 applying students only 104 were actually enrolled later on the courses and started. Hence 383 students had their application invalidated either by not fulfilling the formal prerequisites or by themselves not actively accepting their enrolment once they were approved and had to formally agree to the enrolment.

Reflections and learnings

The cooperation with the partner companies was very fruitful and successful, especially in terms of gathering their competence development needs and discussing priorities with regards to the course offering. The courses were designed on their requests to be completely digital with no mandatory on-campus presence, which also worked very well during the COVID-19 pandemic. All lectures were recorded which created flexibility for the students and allowed them to view the lectures when suitable (Collis, 2002). In addition, the weekly sessions were scheduled so that students get live help from teachers, ask questions, and network learn from each other (Gourlay, et al., 2021). Some working students even asked for some evening time slots for tutoring, which we were able to fulfil as well. Because of these types of special circumstances, we have had many reflections and discussions on the need for finding teachers with the right competence to deliver these types of courses. A teacher in these courses for working professionals must for example be able to plan the course carefully and university leader functions need to make sure that the right teacher competence is available at the right time when the course is to be given. The digital format has required support to be available for less digitally experienced teachers and students. But as everyone gets more acquainted and comfortable with the digital format, which almost happened by force now during the COVID-19 pandemic, we expect the need for such support to decrease going forward.

After our initial course, several weaknesses in the internal administrative processes at our university were identified. Hence, we performed a workshop with all relevant personnel to identify improvement opportunities and to design a process for development and implementation of the courses. Which resulted in the process picture shown back in Figure 1. The workshop identified for example different internal obstacles, different

ways to handle the inertia of the administrative system, and time constraints for new courses. Based on this discussion, a template was developed for gathering the necessary information that the administrative functions need to set the correct dates and specific information regarding the courses in the administrative education systems. Hence, we believe that by following this new process, the amount of manual double checking by the project manager will also decrease going forward.

However, and as previously mentioned. The percentage of students that completed the courses was relatively low. Many of them attended the lectures and did most of the laboratory work but did not go the whole way and presented their work to the teachers. Hence, they did not receive all their ECTS credits, but they hopefully still had gained their desired knowledge which was the primary reason for them attending the course and their lifelong learning. However, we need to revisit the tasks and learning goals to make them better and more relevantly aligned (Biggs, 1996) for the situations of the working professionals. We could also see that the completion rate was higher when there were at least two people attending from the same company as they could work together and discuss the course among themselves at their workplace. Another learning is that oral presentations of the laboratory work were preferred over the written presentation as in the final project report. Finally, a very positive take-away from our implementation of the model was the arranged open lectures at the start of each course. They were particularly good opportunities to market the course by inviting people to take part in this first open lecture and well appreciated by many of our research partners.

Finally, one very important insight we had after giving all these courses was that we have identified two distinct types of courses. And these two types could be characterized based on the number of participants in each course, their different technological focuses, and their degree of co-production with the partner companies.

The first type of course in our model was the broad recruitment courses, which were created based on the broad needs of the industry and our partner companies. The course in applied machine learning was a typical example of this kind of course, where an entire industry is looking for more knowledge in the machine learning field right now. This type of broad courses given in an attractive area has the potential to recruit many students. We see that these courses are important for creating a critical mass in the project and that they provide an opportunity to find new contacts, new students, new collaborations, as well as to market our concept and the other subsequent courses. These courses meet the general needs of the business community and are strongly linked to our regular course catalogue.

The second type of courses were narrower in focus and more specialized profile courses, i.e. courses where we had research excellence. These courses can to some extent be seen as a continuation of the general broad courses, but with profiling towards our areas of expertise and strongly linked to the research within our research profile. A typical example is the course in 5G technologies that we have given within our model, which is strongly linked to our research center, research profile, and a specific research group. The co-production in these courses were higher and the courses themselves were more unique. Where we have been alone, or at least one of few high education institutions in Sweden who even have the knowledge to give these types of specific profile courses.

The future

We are currently working on refining our model and plan for future courses. See Figure 4 for an overview of our new educational concept. One of the primary insights for this future is that we will work more with the different categories of courses. Both the two previously identified types, the broad recruitment courses and narrower profile courses, as well as a completely new third type of course. Which will focus on even greater co-production.

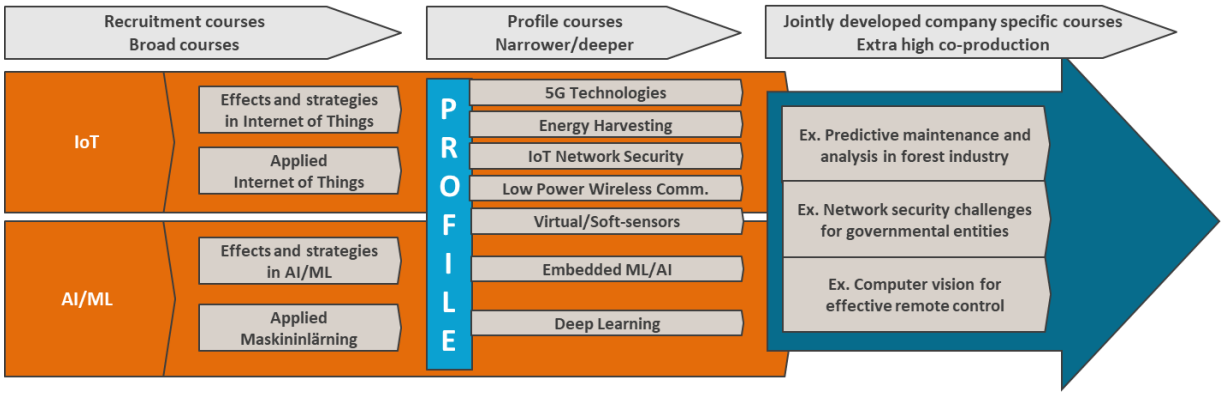

Figure 4: Overview of our general approach and execution for courses aimed at working professionals

We call this third type of course jointly developed company specific courses. In which we will have the deepest co-production, but with a specific company. The purpose of this is to create courses that really address a specific need of a company. But to create such a course will also require a great deal of work, problem analysis, and especially collaboration. We imagine that these courses will be like small joint research projects in course forms, where we together explore an area, learn from each other, work with companies' specific problems and work and apply knowledge from the research front. A form of networked learning between companies and the university. Where one of the goals of these courses is that they should lead to follow-up new research projects from other funders. An example of such a course could be a course in predictive maintenance in the forest industry, which then would be developed together in close collaboration with a company in the forest industry, for example SCA. Another example could be a course in computer vision for effective distance control of machinery, together with for example HIAB which is a company that develops hydraulic cranes.

We are currently working on acquiring funding to implement this next step, as well as a review of the courses didactics and pedagogics to investigate various possibilities and future avenues to explore in order to increase the throughput and increase the activity rate of the working professional students.

Conclusion

This article presented our model for giving courses to working professionals, in the technical domains of computer and electrical engineering. We presented the model itself, a detailed explanation of each part inside the model, our course execution, the student results from these courses, and finally some reflections and lessons learnt.

The first research question was related to which elements that are required for creating lifelong learning aimed for working engineers. We see these leading keywords as our means to address this research question and from which our whole model was created. These key words were: Need and trend-based education offerings, Up-skilling and Re-skilling, Micro-learning and flipped classroom, Flexibility both in time and place, and finally Win-Win possibilities. To these we then have set up a number of activities as parts of the model's implementation. See section Model for more details regarding the specifics around these.

The second research question was on how the pedagogics and didactics can be designed to support networked lifelong learning. Here we see that we have not come all the way to the end, as more work remains.
We have carefully thought and set up many of the activities in our model, including the open first lecture, the self-examining online quizzes, and the self-paced adapted laboratory work. As well as enabling the students to network learn through discussions among the working professionals. However, since the throughput of passed students were low, we need to rethink the final examinations in the courses. The working professionals did neither have the time nor ambition to pass the final part to get a final grade and course credits. Even if many of them did the practical work and gained the necessary skills. Hence, the tasks and learning goals must be better and more relevantly aligned for the situations of the working professionals.

We aim to continue this work during the next year by refining our concept and giving even more courses, as well as achieve even higher co-production with the new co-developed company-specific courses. All in order to enable and support lifelong learning of working professionals and working engineers in particular.

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Networked Learning for Life-Long Learning in Swedish Health Care. A Pilot Study

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Abstract

A healthy work environment in health care requires that staff feel in control and are provided with self-development opportunities, information and adequate resources, all of which lead to job satisfaction. Lifelong learning for health care staff has received increasing attention as a step towards an attractive workplace and safer care. However, people in working life demand conditions that enable them to participate in educational activities. The aim of this paper is to describe experiences of creating and distributing short, flexible and networked courses in higher education, for health care personnel's lifelong learning. Following research questions are included: what challenges have been identified by higher education staff when creating flexible courses for lifelong learning based on networked learning? and what, in the course design, was essential for the students networked learning? The project was built on the assumption that knowledge is empowering for staff and patients, and that organizational learning and behaviour is central for quality. The sociocultural theory of learning, which claims that all humans are willing and able to learn, and that people learn when they realize that the knowledge is relevant and important to them, has inspired. One pilot course was developed, and this paper focuses on the preliminary findings for the course "Peer learning". E-mail, memos and notes were used as data and examined with thematic analysis. The findings showed four themes that answered the aim: identifying courses in collaboration; recruiting and maintaining the participants; learning activities in the course design and improving the course. It was important to have flexibility along with some structure in the course. The three components in networked learning contributed to learning and motivation during the course: relationship between educators, gatekeepers and students, the technology in the digital classroom, and a collaborative engagement. It seems successful working together and networking between the two organizations (university and health care) for a common purpose. The conclusion focuses further on the importance of building a robust network as well as bringing new ideas and needs for lifelong learning from the health care to the university. Further data collection is needed to get additional and deeper insights of health care managers along with workforce experiences and wishes for lifelong learning.

Keywords

Health care, lifelong learning, networked learning, nursing competence development, peer learning

Introduction

Healthcare organizations today have a requirement to provide safe, person-centred care and cost-effective care, which requires staff with a broad competence, who can work at a high pace. For several years, employers have reported difficulties in recruiting registered nurses (RNs), and the global shortage of RNs is recognized (Drennan & Ross, 2019). Lifelong learning for health care staff has received increasing attention as a step towards an attractive workplace. The factors that contribute to work motivation include working independently, working with colleagues from the same profession, being integrated with learning, achieving visible progress and receiving feedback (Ahlstedt, Eriksson Lindvall, Holmström, & Muntlin Athlin, 2019). Historically, health care organizations have been challenged to maintain a supply of qualified and satisfied nurses, with shortages occurring periodically (Buerhaus, Auerbach, & Staiger, 2009). A healthy and attractive workplace based on a learning organization is, therefore, crucial for staff well-being and for patient safety (Sammer, Lykens, Singh, Mains, &

Lackan, 2010). However, people in working life demand conditions that enable them to participate in educational activities. New forms of lifelong learning must be developed to suit the workforce and their needs. To facilitate the implementation of lifelong learning, the internal organization and structures also need to be flexible and able to adapt to various needs and situations (Jaldemark & Bång, 2020).

Background

Learning organization and networked learning

A learning organization can be summarized by following characteristics: strategies, to look within the company, structures, outward-looking and learning opportunities (Pedler, Burgoyne, & Boydell, 1996). The definition of networked learning goes beyond merely denoting 'online learning' or 'e-learning', as it encompasses theoretical assumptions about learning and how to design for learning. The definition stresses the connections between people and between people and resources; it also points to a certain level of social organization between learners, tutors and resources (i.e., a learning community) (Dirckinck-Holmfeld, 2012). A broader definition of networking is suggested by Muijs et al. (2010), who claim that networking is "at least two organizations working together for a common purpose for at least some of the time." The educational networks may consist of a school and one or more organizations, rather than two or more schools, and collaboration can then be described as "joint activities between actors from different organizations within the network". Networked learning is characterised from connections with interactions between humans and learning resources; according to Goodyear et al. (2004), interactions with materials alone are not sufficient for learning. Jones and Dirckinck-Holmfield (2009) state that the nature of the networked learning environment is socially and physically networked and is distributed over time and space. The author suggests that networked learning is mediated by technologies, and ideally technology tools are utilized to support the creation of connections in the networked learning environment. Altogether, networked learning cannot separate human/interpersonal relationship, technology and collaborative engagement; even if focus can shift for a specific education, the other two must cannot be ignored (NLEC, 2021).

Lifelong learning and flexible courses in higher education

Lifelong learning has been defined by several researchers. A Delphi study of (Davis, Taylor, & Reyes, 2014)) aimed to conceptualise lifelong learning from the perspective of nursing and to identify characteristics and essential elements of lifelong learning. Their result showed that lifelong learning in nursing can be defined as a dynamic process, which encompasses both personal and professional life, and this learning process is formal and informal. The most essential characteristics of a lifelong learner were reflection, questioning, enjoying learning, understanding the dynamic nature of knowledge and engaging in learning by actively seeking learning opportunities.

Higher education institutions are involved in professional development through lifelong learning activities and continuous education (Jaldemark et al., 2019). Configurations in networked educational settings need to be flexible to suit the conditions of practices in both settings and should include the possibility for learners to seamlessly link content from working life to their studies, and vice versa (Ang et al., 2018; Blaschke, 2018). Peters et al. (2021) state that many learners are motivated to advance their career through professional development. At the graduate level, online students often choose to combine academic work with professional commitments and family life. Therefore, fully online graduate programs attract the students who need to update their skills and competences as lifelong learners. Peters et al. (2021) further mean that an individual's learning ecology can be considered a dynamic entity characterised by the depth and diversity of learner activities, agentic practices and resources shaped by formal instruction and social support. Hence, the course design seems essential for the students learning.

Nursing

Nursing is an autonomous area of knowledge for which nurses are responsible. Nurses play a key role in improving quality of care and safety in health care. As a practical profession, nursing covers various areas that summarise a nurse's function and responsibility. These are to promote health, treat illness, alleviate suffering, rehabilitate, teach and supervise, organize, manage, lead and develop the profession, thus ensuring quality (Meleis, 2018). Nursing science as a scientific subject aims to make care better, safer and equal for both individual patients and groups of patients.

Patient outcome and person-centred care are central in all nursing. In nursing research, the term clinical judgment is synonymous with critical thinking, decision making and clinical reasoning (Tanner, 2006). In situations where

nurses must make clinical decisions, it is important for them to carefully consider the issue or problem they are facing, as it influences what research evidence should be used to make the decision. Evidence-based nursing is one of the core competences in nursing, and it means the application of valid, relevant and research-based information in nurse decision-making. However, research is one of four considerations in making a clinical decision. The others are patient references and circumstances, available resources and nurse's judgement and expertise (Aitken et al., 2015). Altogether, RNs face different pedagogical challenges. First, the RNs must adapt to new knowledge, with formal and informal lifelong learning, and develop their own and nursing students' competencies. Secondly, they also have an important pedagogical challenge in educating patients and their relatives about tasks that concerns procedures, health and self-management (Pilhammar, 2019). This challenge is seen in a study of Häggström and Bäckström (2014), where RNs had a pedagogical task to succeed with their interaction with the families and inform them several times about the progress, care plans and goals for the sick patients. Additionally, at the same time, they must be competent in caring for sick patients that were transferred in the health care chain (Haggstrom & Backstrom, 2014).

Training clinical skills is a crucial part of the nursing curriculum. Lack of training may lead to anxiety, worry and speculation about professional nursing competence (Reid-Searl et al., 2012). In the nursing curricula, a lot of practice must be included. This is regulated in the EU-directive; a minimum half of the education should be clinical practice (2005/36/EG). One of the most important issues to solve for the future is the opportunity for nursing students to have their mandatory practical training. This is, unfortunately, a complex issue to solve, due to the shortage of RNs who can act as supervisors, combined with the downsizing of patient beds in the health care section. A new model for supervision "peer learning", has been implemented and studied in many contexts. Peer learning is a structured educational model with learning activities that aim to develop students' independence by learning from and with each other (Topping, 2005). The "peer learning model" means that one RN is responsible for the supervision for two nursing students instead of the ordinary one-to-one, and the peer shall actively seek solutions and answers. The core elements of the model are a close collaboration with a peer, reflection, communication, self- and peer assessment (Boud, Cohen & Sampson, 2016). The findings of Sandvik, Karlsson, Zetterman, and Eskilsson (2020) indicate that the model can enhance learning. Strong cooperation and feelings of safety were found to boost learning and encourage the students to challenge themselves and to work independently increased their ethical orientation, knowledge, self-esteem and self-confidence. Implementing peer learning in health care requires well educated supervisors with knowledge about the model's challenges. A recent systematic review showed that peer learning is beneficial in supporting nursing students' development and competence, especially it benefits their confidence and team working skills. It was concluded that any form of collaborative placement model requires careful planning and continuous preparation for staff and students (Markowski, et al 2021).

Aim and research questions

The aim of this paper was to describe experiences of creating and distributing short, flexible and networked courses in higher education, for health care personnel's lifelong learning.

- What challenges have been identified by higher education staff when creating flexible courses for lifelong learning based on networked learning?
- What, in the course design, was essential for the students networked learning?

The research context – health care

We know today that well-organized, efficient care units with a learning environment result in better patient safety and continuity. Informal and formal education in health care that supports nurses' competencies is essential. Education contributes to increased patient safety, and these skills should be available throughout the entire continuum of care. Research indicates that a healthy work environment in health care requires that staff feel in control and are provided with self-development opportunities, information and adequate resources, all of which lead to job satisfaction (Upenieks, 2003). In the United States, hospitals can apply to receive a *Magnetic Recognition*, a certification for those hospitals that meet specific quality criteria and are attractive employers. These hospitals are characterised by dedicated leaders and employees, and nursing science permeates the entire organization. Such hospitals are characterised by staff experiences, empowerment, competence development, good leaders and promotion of nursing expertise and professional nursing. Studies show magnet hospitals do have higher percentages of satisfied RNs, lower RN turnover and vacancy, improved clinical outcomes, greater nurse autonomy and improved patient satisfaction. This is in concordance with the result of a study by Häggström et al.

(2009), who conclude that a learning organization with professional development, continuing education and organizational support provides enhanced capabilities for better inter-hospital cooperation and increased patient safety.

Leaders and managers in hospitals strive to create an attractive workplace with staff continuity. In a study by Upenieks (2003), magnet hospitals were compared with other "regular" hospitals. At magnet hospitals, nurses experienced autonomy, control and empowerment. They stated that they had formal and informal continuous education and training, and that the resources available were sufficient to enable them to do a good job. On the other hand, the nurses in the non-magnet hospitals expressed significantly less satisfaction and had a higher turnover. Managers at magnet hospitals described their workplace as a dynamic organisation in constant development, with a wide range of training opportunities for nurses. Hence, it is important to create a learning environment where staff can feel their own control and security through their own competence. Research indicates that executives and leaders involved in the process have positive effects even before designation was achieved (Ulrich et al., 2007). The journey to magnet excellence is described as important as the destination; it builds visionary, inspiring nurse leaders at all levels, enculturates excellent nursing science and establishes innovative ways to achieve new heights of quality, efficiency and effectiveness (Drenkard, 2010).

A large European study (12 countries) from 2013 showed that one in five nurses (11–56%) were dissatisfied with their jobs in most countries, and dissatisfaction was pronounced with respect to wages, educational opportunities and opportunities for advancement. Many nurses intended to leave their jobs (19–49%) (Aiken, 2013). A Swedish inquiry about the future specialist nurse education in 2018 also emphasised the need of lifelong learning for staff in health care students along with the knowledge and ability required to independently work as a specialist nurse. Specialist nurses are responsible for providing advanced nursing within health and medical care; they are necessary for equal and safe care to be provided based on science and proven experience. The purpose of the inquiry was to ensure future education should meet the changing needs of health care. This resulted in the report, *The specialist nurse of the future – new role, new opportunities* (SOU, 2018, p. 77). It suggested that key factors for achieving this include providing employers with tools for planning the skills in a sustainable manner and introducing further training requirements in accordance with EU legislative requirements, thereby improving patient safety. Taken together, the proposals in this report focus on improving both the conditions for lifelong learning and the attractiveness of the specialist nurses' profession.

Method and design

The overall larger project aimed to network with health care organisations, to strengthen professional competencies and stimulating lifelong learning by delivering short, flexible courses for staff in Swedish health care. We assumed that knowledge is empowering for staff and patients and that organisational learning and behaviour is central for quality, inspired by the sociocultural theory of learning, which claims that all humans are willing and able to learn (Säljö, 2000), and that people learn when they realise that information is relevant and important to them (Knowles, 1980). The course developer and two more lecturers were involved in the course. Two different pilot courses were developed that were provided two times each, and this short paper focuses on the preliminary findings for one of these courses: "Peer learning". The course developer's E-mail from gatekeepers and participants in the courses was used as data along with the course evaluation (EvaSys) and the memos and notes taken before, during, and after the course. The data illustrated ideas, challenges, and needs for the course development, and were analysed and clustered through a qualitative thematic analysis by the researchers, answering the research questions. This thematic analysis is a flexible and suitable method for identifying, analysing and reporting patterns (themes) within data. An inductive analysis, following the six steps as described by Braun and Clark (2006), was conducted. The first step, "familiarizing yourself with your data", included reading and re-reading the data, and noting down ideas about the findings. The second step included generating initial codes, which meant systematically coding the data across the entire data collection and collating data relevant to each code. In the third step, we searched for themes, which meant collating codes into preliminary themes and gathering all data relevant to each potential theme. This step was followed by the fourth step, reviewing the theme, which meant checking if the themes worked in relation to the coded extracts and the entire data set, which also involved generating a thematic 'map' of the analysis. In the fifth step, an ongoing analysis to refine the specifics of each theme was the focus as well as defining and naming themes and the overall story the analysis tells, and generating definitions and proper names for each theme. The last step, producing the report, meant the final opportunity for the analysis. Through a selection of examples and final analysis of the selected extracts, all relating back of the analysis to the research question and literature, a scholarly report of the analysis was produced. Four themes were at last identified: all captured patterns and

something important about the data in relation to the research question, representing some level of meaning within the data set.

Findings

The analysis of the E-mail, memos and notes resulted in four themes that illustrate experiences and challenges in creating and distributing short, flexible and networked courses in higher education, for health care personnel's lifelong learning. These themes were identifying courses in collaboration, recruiting and maintaining the participants, learning activities in the course design, and improving the course.

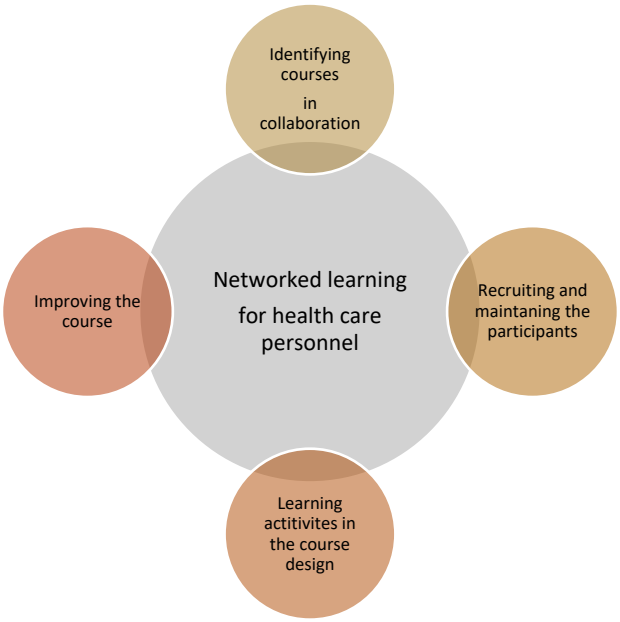

Figure 1. An overview over the themes

Identifying courses in collaboration

The importance of a natural, reliable network to interact, discuss and capture relevant ideas for new courses was perceived as essential. The connections and the relationship between the people in health care, and between the educational resources, were crucial. The course developer collaborated with two gatekeepers from the participating and collaborative organization health care sections. Many suggestions were discussed as a possible first pilot course; there was a broad interest for an amount of different lifelong learning courses.

Text from e-mail from a gate keeper:

> Thank you for offering new courses! The managers in our hospital suggested a course in one of the below mentioned areas:
>
> - Peer learning /Implementation of evidence-based care /Advanced urology nursing practice / Advanced assessment of the abdomen and gastrointestinal problems.

However, the need for higher competence and knowledge related to new supervision models in health care was identified as a matter of interest for both organizations and the idea of the making of the course "peer learning". The pilot courses were, from the start, planned to be free of charge and 100% digital. This course was identified as important for both the university and for the health care, as supervision and preceptors for student nurses' practice are restrained and a problem; hence, new ways to solve these issues are requested.

Recruiting and maintaining the participants

One challenge was how to recruit the participants. Recruiting and maintaining participants in the course required networking and health care leaders who were willing to let their staff study at work. In this course, the participants were recruited in two regions and two hospitals, in Sweden. The gatekeepers distributed information about the course to managers, who helped recruiting interested participants. The participants came from different but similar working context, which led to social activities and networking with others. The participants differed in age and their knowledge about digital tools. The students showed motivation for the course. This was seen in the memos written from the seminaries. Additionally, many fulfilled the course; in the first course, there were 11 participants (10 fulfilled), and in the second course, there were 18 (18 fulfilled). To maintain the participants, it was essential that the course and the teachers had sensitivity and flexibility to different needs and a problem-solution attitude. One example is that the participants said that they did not want full flexibility; instead, they asked for more scheduled meetings so that they could claim for time to study at work. Initial support in the start of the course was also important; therefore, the students were guided into the digital classroom by an assistant from the university. The final time for submitting written examinations was also flexible, to suit the participants.

Learning activities in the course design

The learning objective for the course were directed to suit the implementation of the new model at their workplace (Table 1).

The course's learning objective is that the student should:
1. describe, analyse and reflect on how structured peer learning can develop the student's learning
2. reflect on students and supervisors' pedagogical roles and responsibilities related to peer learning
3. evaluate strengths and challenges in connection with peer learning and conclude on how this can be handled to achieve good quality in the supervision process
4. develop proposals for implementation and describe how peer learning can be implemented during practice for nursing students

Table 1. The peer learning course´s learning objective

The data showed that the learning activities that worked well in the course to achieve the learning objective were influenced by pragmatism. Text from one memo illuminated this: The students told me today that they *really appreciated that the modules and the final examination were something that they "for real" could use in their unit.*

The online activities that worked well were flexible but with structure – the students used the digital classroom combined with own studies. Some notes also indicated that students appreciated the opportunity to meet and discuss in the Zoom-rooms, which also included "most-unclear discussions-seminary" (MUD), where the student could ask questions and interact with teachers and other students.

The course was designed with module-based activities, a combination of individual and collaborative activities where students were mutually dependent on each other but could also have a high degree of learner freedom. The two first modules were formed to provide the students with theoretical knowledge and understanding of the pedagogical assumptions that formed peer learning as a model. Pre-recorded lectures were included in the modules. The last and largest module was formed around the students' own enquiry into a social problem: overcoming different identified problems implementing peer learning as a model. Thus, the learning activities emphasised students' motivation and freedom when it came to defining and working with their problem. In this module, the students had to plan the implementation of peer learning, as a new model for supervision, according to Deming's plan-do-study-act process. They were also asked to identify eventual obstacles at their own unit, and plan for overcoming them.

The design also included interaction between students in a group and between the groups in the class; the last examination included to take part of others' planned implementation and discuss and reflect upon it.

Improving the course

The E-mail and the memos illuminated that short courses for health care staff's lifelong learning should be constantly improved, a process that was also benefited by networking. The standard evaluation forms the university was using were not suitable for capturing the needs of lifelong learning. Instead, broad evaluation was important

to capture the students, the teachers from higher education and the organisation's needs. The evaluations from the first peer learning course showed that students wanted opportunity to be well prepared when starting the course. They wanted to have fixed dates so that they could schedule for planned lessons and a study guide early so that they could by the literature. This was changed in the second course. The gatekeepers were also shown to be valuable resources to validate the content and design of the course.

> I want to give you information that we get very good feedback on the peer-learning education that you offer this semester, with a request that we continue to be offered places. We will soon also initiate a project where we use the knowledge that these employees bring back to introduce peer learning in a couple of pilot units. Hope you see it as possible to continue to offer this education and that we can continue to get a couple of places.
> *– E-mail from one of the gate keepers*

Conclusion and further directions

The three components in networked learning (NLEC, 2021) contributed to learning and motivation during the course: relationship with educators, gatekeepers and between students; the technology in the digital classroom and a collaborative engagement. The findings also indicate that networking with shared projects for health care staff's lifelong learning is an essential need. Therefore, building a robust network seems to be central for identifying real educational needs in health care, which also benefit the university, as the staff in the higher education are being updated. Health care organisations should have strategies for their lifelong learning and networking with the university, which could be a solution. A learning organisation requires strategies, to look within the company, structures, outward-looking, and learning opportunities. We also know that informal and formal education in health care that supports nurses' competence is essential for retaining RNs. Health care staff should feel in control and be provided with self-development opportunities, information and adequate resources, all of which lead to job satisfaction (Upenieks, 2003). We also conclude that working together and networking between the two organizations (university and health care) for a common purpose could lead to success. More research is needed to get a deeper knowledge about leaders' and the workforce (the health care staff) perceptions about prerequisites for life-long learning.

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Nurses' experiences from a flexible online course in a higher education learning initiative

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Abstract

Remote healthcare is developing at a rapid pace to create high-quality, efficient, and financially sustainable care. The article aims to describe and explore nurses' experiences of networked learning before and after participation in a higher education lifelong learning initiative. The study was conducted in primary healthcare and hospital units in Sweden with ten nurses (eight women and two men), where the participants answered a web-based questionnaire before and after participating in an online course, Digital Competence in Care. The data were analysed with descriptive statistics and qualitative content analysis. The results show increased development of nurses' competence and learning. The mean of digital competence among all participants increased from 4.4 to 8.9 on a scale of 0-10 and the mean of expectations for learning among all participants increased from 7.1 to 9.2 on a scale of 0-10. Furthermore, two themes were identified: Lifelong learning important and urgent for nurses and Networked learning a flexible way to strengthen learning and think outside the box. The content and design of DCC were experienced as relevant for the participants, and networked learning was perceived as a way of developing and strengthening learning and competence. The participants indicated that sharing experiences and networking with others supported them in solving problems in their daily work, "thinking outside their own box," and putting ideas into action together to support a critical and responsible attitude. The use of authentic work-related problems in the course assignments was experienced as a good thing, as it supported the nurses in their everyday work. Finally, the participants described how they became more courageous and confident in their ability to communicate and work securely digitally, and also that their new knowledge and competence were relevant to the continued development of digitalisation in healthcare settings and medical care, as colleges and leaders turned to them for support and advice.

Keywords

Flexible online courses, healthcare, higher education, lifelong learning, networked learning, nurses, pandemic

Background

Health care in Sweden is a knowledge-intensive area that is undergoing a paradigm shift from physical care meetings to distance care via digital technology. The aging and increasing population, together with declining financial and human resources, has created a gap between the needed and available resources (Stroetmann et al., 2020). In Sweden, there is a push to reform the healthcare sector to include more digital services in healthcare (Swedish Municipalities and Regions, 2016; Erlingsdottir & Sandberg, 2019). The vision of the digitalization of healthcare in Sweden points out, that in the year 2025, Sweden will be one of the worldwide leaders in digitalisation and eHealth with high-quality and equitable healthcare and welfare (2016). According to the World Health Organization (WHO, 2011), the importance of eHealth will continue to increase, with digital technology being used to treat patients, conduct research and education, track diseases, and monitor public health.

Given their documentation responsibilities, nurses are a key person component in healthcare services' digital care information systems (Duplaga, 2016). They are also the professional group in the Swedish healthcare system with the largest number of licensed staff (Swedish Nurses' Association, 2019). The role of nurses in digital care is multidimensional and contributes to development around information management, strengthens patients' health,

and provides high-quality, secure digital care (Ross & Cross, 2019; Swedish Nurses' Association, 2019). Digital technology is changing the way nurses work, which creates the need to acquire and assimilate new skills (Ahonen et al., 2016).

To benefit from eHealth, nurses must be flexible, pedagogical, and capable of handling technological changes and challenges (Honey & Wright, 2018). Nurses must also be able to combine the traditional clinical approach with new digital approaches (van Houwelingen et al., 2018). The transition of healthcare from physical visits to digital care meetings has taken place in a short time, challenging nurses in terms of lifelong learning to find new, sustainable ways of developing and increasing their digital competence to use digital technology in and networked learning for both themselves and the patients.

Networked learning is defined as learning in which information and communication technology (ICT) is used to promote connections: between one learner and other learners; between learners and tutors; and between a learning community and its learning resource (Goodyear et al., 2004). According to Goodyear et al. (2004), networked learning is characterised by connections with interactions between humans and learning resources; therefore, networked learning is well suited for nurses' individual learning together with others as well as for communication with patients in care meetings. Therefore, more information and knowledge, and a deeper understanding, of lifelong learning and networked learning needs from the nurse's point of view was required, and a pilot online course, *Digital Competence in Care* (DCC), with the purpose of meeting and increasing nurses' digital competence, lifelong learning, and networked learning, was developed. To the authors´ knowledge, at the time of this study, no such tailored online courses in Sweden met nurses' need for education.

The online pilot course Digital Competence in Care

DCC was developed as a pilot course in a collaboration between researchers, educators from higher education, public health workers, and senior nurses from various healthcare settings who met on several occasions and discussed the content and design of the course. This resulted in six statements of the content in digital competence: to have a critical and responsible attitude, to be able to solve problems and put ideas into action, to be able to use and understand digital tools and media, to understand the impact of digitalisation on healthcare systems and society, to have the patient in the center, and to work safe and secure according to the law and ethics. This resulted in a flexible online course containing five sections with content relevant for nurses' digital competence and a design with digital seminaries to stimulate and increase networked learning.

To enable participation given nurses' irregular working hours, it was emphasised that the course must be flexible. Therefore, the course was online with no physical meetings and with recorded lectures (films) and a study guide containing reading instructions for each section. The sections in the course were eHealth; Person-centered care; Documentation in digital medical records; Digital care meetings with patients and pedagogy; Law and ethics in digital care; Remote care - Digital care and organizational development. All course materials were always available for the participants. The starting point in DCC was from the participant's prior experiences and issues related to their work, and the course was designed and conducted with a curriculum of seminars for each section. Before the seminars, the participants prepared themselves with the course literature, research articles, and their own experiences. At the online seminars, all participants met to share and exchange experiences, learn from each other, and start networking. DCC was designed from the concepts *Bring-Your-Own-Data* (BYOD1)—work with real and authentic problems or issues that the participants identified themselves through their work or activity (Jaldemark & Öhman, 2020) and *Bring-Your-Own-Device* (BYOD2)—the participants used equipment (computer, etc.) from work (organization-owned) (Cheng et al., 2016). DCC was also inspired by *Learning by doing* (Dewey, 1916); for example, the participants worked together with authentic problems and also got support from the seminars where they shared their experiences. The course had two assignments (written and oral): one related to the content in the course literature, films, and research presented, and one related to the organisations'/participants' own data.

To facilitate networking and communication, the course design utilised a range of educational tools and ways of learning that supported networked interaction. The participants engaged in learning activities that encouraged them to create and share knowledge, particularly regarding their own digital work experiences. Since the participants were based in different parts of Sweden, they had the opportunity to compare and discuss issues related to practice. Communication was supported through online discussion (chat fora), mediated by the teachers, and through asynchronous discussions. There were also a scheduled discussion fora called "Zoom drop-in" to not only support learner-directed discussions and questions but also share knowledge and experiences from practice.

The last section in DCC focused on future organisational development. Here, the participants were challenged to expand ideas around development projects for healthcare practice. To visualise a read thread in the DCC course and to practice gamification, all participants and the teachers used and played a digital game on an application, focusing on person-centred care in DCC (GPCC, 2017). The use of different applications is common in healthcare settings, for example, with patients diagnosed with a long-term illness such as diabetes; it was also possible to learn by doing together while playing the game and to reflect and discuss person-centred care together in the network (Table 1).

Week	Seminars in Zooom (4h/each)	Content	The person-centred game
1	1	eHealth and Person-centered Care (PCC)	Levels 1-3
3	2	Documentation in medical records and digital care	Level 4
4	3	Digital care meetings with patients and pedagogy	Levels 5-6
8	4	Law and ethics in digital care	Levels 7-8
10	5	Remote care - Digital care and organizational development	Level 9

*The DCC course was organized in five seminars at four hours each for a total of 20 hours for 10 weeks.

Table 1 An overview of the pilot course Digital Competence in Care*

Aim and Research Questions

The aim of this study was to describe and explore nurses' experiences of networked learning before and after participating in a higher education lifelong learning initiative.

- How do nurses perceive the development of lifelong learning with a focus on digital competence?
- How do nurses perceive the development of networked learning with a focus on digital competence?

Methods

Design

A quantitative design with descriptive statistics was used to describe and explore nurses' experiences before and after participating in the pilot course DCC (Polit & Beck, 2017).

Questionnaire

To gain an understanding of how the DCC-pilot was perceived according to content, design, and relevance, a questionnaire was created. The questionnaire included general questions regarding age, gender, and level of education (bachelor's or master's degree in nursing). Furthermore, the questionnaire included self-rated questions about the participants' experiences of digital competence and expectations of learning, using a 10-point Likert-type scale ranging from 1 = "no competence" to 10 = "very competent" and from 1 = "no expectations" to 10 = "high expectations", before and after participation in DCC, as well as open-ended questions about the content, design, and relevance of DCC.

Research context

The study was conducted in primary healthcare and hospital units in Sweden during the spring of 2020. Ten nurses participated in the DCC-pilot from February to April 2020 for ten weeks. One week before the start of DCC and two weeks after the end of DCC, all participants received an e-mail invitation to the questionnaire, with questions about digital competence and their experiences participating in the DCC-pilot.

Participants

The participants were ten nurses (eight women and two men); three had a bachelor's degree in nursing and seven had a master's degree in nursing. The age varied between 25–62 years (mean = 41.6 y, median = 40,5y).

Participants	Gender	Age*	Education
Nurse 1	Female	33	Master's
Nurse 2	Female	25	Bachelor's
Nurse 3	Female	28	Bachelor's
Nurse 4	Female	62	Master's
Nurse 5	Male	47	Master's
Nurse 6	Female	32	Bachelor's
Nurse 7	Female	53	Master's
Nurse 8	Male	55	Master's
Nurse 9	Female	46	Master's
Nurse 10	Female	35	Master's

*Age mean = 41,6y age median = 40,5y

Table 2 Characteristics of the participants in the pilot course Digital Competence in Care

Data analysis

The data included 20 questionnaires; each participant answered the questionnaire twice. The data were automatically entered into IBM SPSS version 27, from Netigate, and analysed using the same program. Descriptive analyses for comparing differences in digital competence among the participants were conducted using the chi-square test (Polit & Beck, 2017).

The open-ended questions were analysed using summative content analysis, where keywords are derived from the interest of researchers according to Hsieh and Shannon (2005). Answers from the open-ended questions were read repeatedly independently by the authors. Based on differences and similarities, the content was organised into themes through a back-and-forth process by the authors. The themes were illustrated with representative quotes from the participants. The analyses were conducted in Swedish and further translated into English in the final stage of the analyses.

Ethical considerations

The study was conducted following the Declaration of Helsinki (World Medical Association, 2018), assessed by the Ethical Review Agency in Sweden (Dnr: 2019–03353), and conducted according to the ethical principles recommended by the Research Council.

Results

Increased development of nurses' competence and learning

The result showed that the participants' prior digital experiences varied a great deal. Some participants used social media daily to keep in touch with family and friends and occasionally play online games; in addition, some participants had taken several courses in higher education and participated in local development projects at their work. There was an increased development of digital competence and expectations for learning among all participants. The mean of digital competence among all participants increased from 4.4–8.9 on a scale of 0-10 while the mean of expectations for learning among all participants increased from 7.1–9.2 on a scale of 0-10 (Figures 1 and 2).

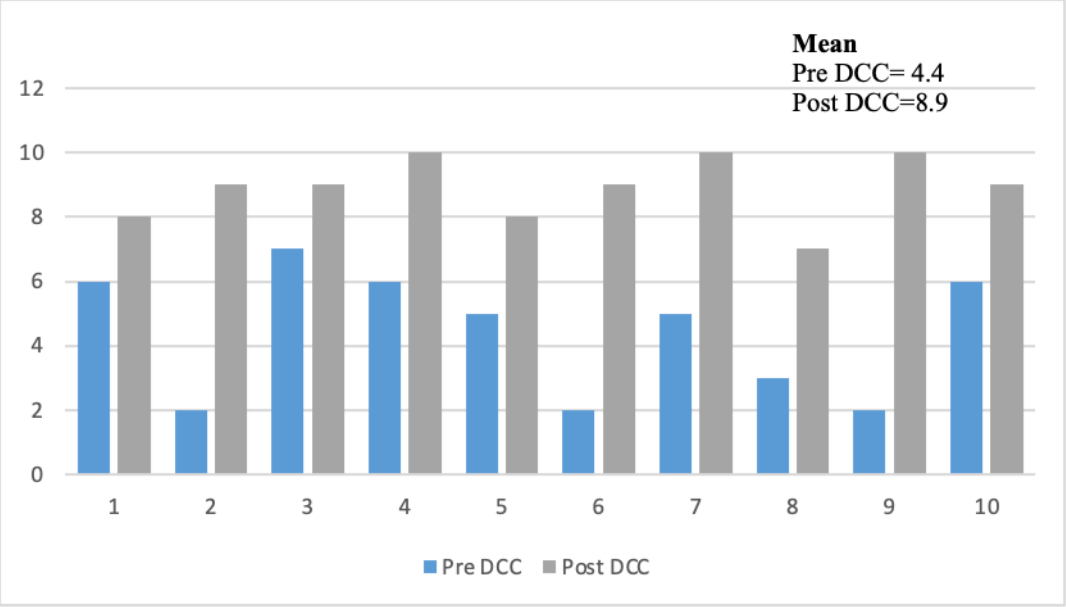

Figure 1 Nurses' self-rated digital competence before and after participating in DCC

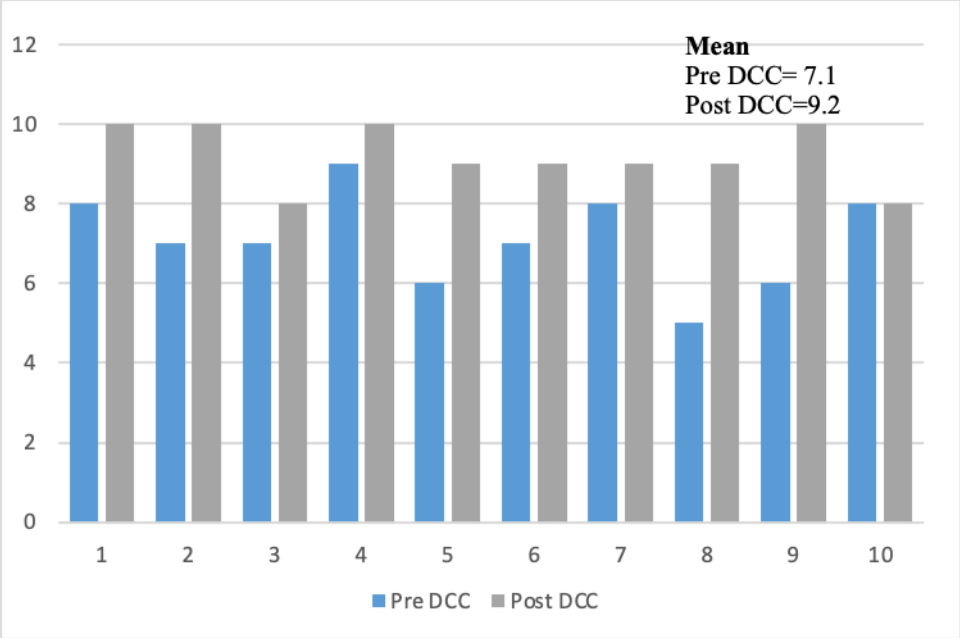

Figure 2 Nurses' self-rated expectations for learning before and after participating in DCC

The open-ended answers

All 10 participants answered the open-ended questions twice. There were some short answers about a couple of sentences, ranging from one sentence to six sentences, but there were also answers with longer texts. Summative content analysis according to Hsieh and Shannon resulted in two themes: *Lifelong learning important and urgent for nurses* and *Networked learning a flexible way to strengthen learning and think outside the box.*

Lifelong learning important and urgent for nurses

There were several comments that nurses must learn more about digital communication because nurses are responsible for giving secure and efficient information to patients and good communication skills are therefore vital. Several participants mentioned as important the need to support care and communicate digitally, in a secure

and effective way, with patients who live far from the hospital. However, the nurses found it stressful and impossible to keep up with the digital development and to develop their own skills in their spare time, as there was seldom or never an opportunity to do so during working hours. It was also difficult to find relevant courses with the focus needed in clinical work; the participants experienced a continuous need to strengthen their competence to keep up with the demands of their work. The design and structure of DCC with BYOD1 and BYOD2, where participants worked with authentic related work problems at their workplace, was perceived very positively; the flexibility, with all material always being available, and communication in various fora as well as the Zoom drop-in sessions, enabled participation despite high workloads and working hours.

> *There is a digital revolution going on and we must keep up with it whether we want to or not because many patients are already ahead of us…*

There were also responses about the various levels of competence and attitudes towards learning in different workplaces and how this affected the participants' possibilities to increase their own learning. For example, when the boss was reluctant, it was hard to implement new ways of working. Since the Covid-19 pandemic was ongoing during DCC, the participants expressed a change of interest in the course and in lifelong learning.

> *My colleges asked me for advice and even the most reluctant college suddenly was willing to try with digital patient meetings. I was co-host just like in the seminars and it worked out just fine!*

All participants agreed that the content was relevant in DCC, that digital competence and e-health must be present in all nursing education, and that there must be courses for senior nurses to complete and strengthen their competence and learning. The participants wanted to learn more and new things, especially about legislation, to increase their knowledge of current research, gain competence in becoming safer at work, and be able to support and help patients and colleagues. The open-ended responses showed that the ability to understand and use digital tools and media safely and securely according to the law and ethics was highly relevant to the participants.

> *I really want to understand what I do, to feel safe and have control that I do not do anything wrong or illegal. I need to know what happens to the information about the patient when I press the button on the computer. Not the technological but what and with whom the information ends up.*

Networked learning a flexible way to strengthen learning and think outside the box

The design of DCC-pilot with networked learning was positively perceived by the participants and was experienced as a way of developing and strengthening learning as well as competence. Getting inspiration from others and perhaps starting collaborations in the future was a positive experience for the nurses. The participants also indicated that sharing experiences and networking with others supported them in solving problems in their daily work, "thinking outside their own box," putting ideas into action together, and having a critical and responsible attitude, and that they had learnt by doing this in DCC. The use of authentic work-related problems was also experienced as a good thing because it supported the nurses in their everyday work; DCC did not burden the participants with large assignments intended simply to achieve credits; they could use the results from the assignments immediately in their work, as they were work-related. Finally, the participants described how they became more courageous and confident in their ability to communicate and work securely digitally, and that their new knowledge and competence were relevant to the continued development of digitalisation in healthcare settings and medical care, as colleges and leaders turned to them for support and advice.

> *My boss asked me if I could start a project on how to develop our digital patient meetings.*

Discussion

The aim of this study was to describe and explore nurses' experiences before and after participating in a higher education lifelong learning initiative. This was investigated by developing an online pilot course, *Digital Competence in Care*, and a questionnaire in collaboration with researchers, educators from higher education, public health workers, and senior nurses from various healthcare settings before the start of the Covid-19 pandemic. A positive result was the increased development of lifelong learning with a focus on digital competence and expectations for learning among all participants. Also, all participants perceived that the design and content were relevant for them in the development of their digital competence and that the DCC-pilot enabled participation even during the pandemic. Networked learning was perceived as being a very positive way to learn together with others and as a way of developing and strengthening lifelong learning as well as individual competence. Networked

learning implies a togetherness in learning with the sharing of experiences and joint reflections in a network of participants. A study by Dalsgaard et al. (2019) involving midwives showed that networked learning was learning characterised by self-reflection, as the midwives reflected on what they have learned and what they need to learn next, and expansive critical thinking, as they learn and plan how they will apply this learning across different areas of practice. This way of reflecting and thinking was also experienced by the participants in DCC. In addition, the participants indicated that sharing experiences and networking with others supported them in being able to solve problems in their daily work, "thinking outside their own box," putting ideas into action together, having a critical and responsible attitude, and learning by doing (cf. Dewey, 1916). This is in line with Goodyear et al.'s (2004) description of networked learning as characterised by connections with interactions between humans and learning resources.

The assignments in DCC were related to the course material (literature and films) and the participants' own data (BYOD1) (Jaldemark & Öhman, 2020); participants worked with authentic work problems often situated at their workplace (BYOD2), which was perceived positively, as it enabled participation and had an almost instant effect on clinical practice.

Methodological considerations

The questions within the questionnaire were carefully chosen and in line with the current study as well as previous research, but the questionnaire itself was not validated. The open questions were included so that the participants could express themselves freely; the questions made it possible to scrutinize the participants' understanding of what was asked. In considering the results, it is important to bear in mind that the nurses who participated might possess a more in-depth understanding of, or interest in, the area of investigation. The online pilot course was conducted during the pandemic, which could have influenced the results in both positive and negative ways. Due to the pandemic, there was an enormous need for educational possibilities regarding digital competence, but the pandemic also affected the working conditions of the participants and the possibilities to participate in the DCC-pilot. Also, there were only ten participants; with a small sample, it is important to be careful of far-fetched conclusions. While the sample provided useful information about the feasibility and relevance of the content in the DCC-pilot, there is a need for more research to further establish reliable conclusions regarding nurses' experiences of participating in a higher education lifelong learning initiative such as the DCC-pilot.

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A tentative model for sustainable pedagogical digital competence development: Exploring networked learning in an educational development project

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Abstract

This paper addresses one large university initiative for educational development aimed at further developing educations and teacher competence with a focus on technology-enhanced and lifelong learning. The aim of the paper is to describe and problematize the design of an ongoing project for educational development, Higher Education and Digitalisation (HEaD). It focuses on identifying key components of an educational development project for technology enhanced learning as well as how such a project can be organized to sustain in regular university operations. The article discusses how a project for educational development can create over-time durable infrastructures, organization, policy and motivation for maintaining a continual educational development. In the first phase of the project, a model was developed for how competence development can be conducted sustainably. This model contains two perspectives: (1) an organizational perspective that focuses on the key partners to be involved; and (2) a process perspective that focuses on activities and aims in strategic competence development projects. The tentative model with its two perspectives is described and discussed in this article as a preliminary result. The model includes four identified key entities and their roles in pedagogical digital competence development; academic departments and their faculty, educational developers, infrastructure and IT-department and the pedagogical research unit. Further, a process model based on existing support structures, complemented with activities that can be sustained after the HEaD project ends is presented.

Keywords

educational development, lifelong learning, pedagogical digital competence, sustainable teaching and learning, technology enhanced learning

Research Context

The digitalization of university education is resulting in both new opportunities and challenges for teachers and introduces a new dimension of pedagogical skills and competences (From, 2017). The process of digital technologies transforming previous educational traditions are creating substantial demands for universities developing strategies to back new competences needed for high quality teaching and learning (Pettersson, 2018).

Universities often offer pedagogical development activities for teachers including both shorter courses for university teachers as well as more extensive pedagogical development programs. One key issue for the progress of university education, however, concerns the achievement of long-term sustainable development through for example pedagogical development activities. Research shows that teachers' individual and collective empowerment needs to be facilitated and supported by multiple networked and physical resources in order to

succeed with the progress of university education. Not the least the support from institutional leaders is important for teachers to adopt new pedagogical practices (Du & Lundberg, 2021).

Plechova et al. (2012) discuss different ways in which educational development best prepares academics to teach and how to best enhance teaching and learning in universities. One highlighted point is that successful programs for educational development relate to participants' own needs as well as offering rich opportunities for dialogues between colleagues. They also point out that supportive contexts are needed where teachers can experiment with different teaching methods.

Although Mid Sweden University has a long and extensive experience with networked education, the Covid-19 pandemic significantly accelerated the development of pedagogical digital competence as well as helped to identify further development needs. According to Zhu and Liu (2020), the long-term integration of digital technologies to enhance teaching and learning into university curricula however implies further attention to quality.

Research shows that high quality in networked education implies the opportunity to ensure students' participation and presence and teachers' ability to implement their pedagogical digital competence in their teaching (Arbaugh et al., 2008). To create the best possible experience of and quality in learning, the proposed model takes inspiration from the framework Communities of Inquiry (CoI) (Garrison et al. 1999; Garrison et al. 2001; Rourke et al. 1999). CoI is based on a process where the creation of deep and meaningful experiences of learning is central. To achieve this, three different forms of presence are emphasized: teaching, social and cognitive. If there is a high degree of presence in these three forms, the student experience will be stronger and more qualitative. The presence of teaching emphasizes commitment to the goals and forms that the education applies. Social presence affects the engagement with the environment and other participants. The cognitive presence emphasizes the commitment to the content of the education. The expected effect of the proposed model and on is that educations at the university are characterized by a culture where students and teachers, through joint critical thinking and reflection, contribute to personal meaning creation and common understanding. If the proposed model, tested in a project at Mid Sweden University, succeeds in creating good conditions for raising teachers' pedagogical digital competence and thereby contribute to raising the university's general educational quality, it contributes to all students' education since boundaries between campus-based and distance-based education are blurred.

This paper addresses one large university initiative for educational development aimed at further developing educations and teacher competence with a focus on technology-enhanced and lifelong learning. One goal (and challenge) with this project concerns what happens after the project; how can the project create over-time durable infrastructures, organization, policy and motivation for maintaining a continual educational development.

Aims and Research Question

Against this background, the aim of this paper is to describe and problematize the design of an ongoing project for educational development, *Higher Education and Digitalisation* (HEaD). It focuses on the following research questions:

- What are the key components of an educational development project for technology enhanced and lifelong learning?
- How can a project for pedagogical digital competence development be organized to sustain in regular university operations?

Methods

In order to address the research questions stated above, Mid Sweden University has in 2021 started a university-wide project with the name Higher Education and Digitalisation (HEaD). The HEaD project supports the fulfillment of the university's strategic goal to be a national and international key-player within technology enhanced learning (TEL) and lifelong learning. It approaches this goal by supporting the faculty's competence development in this domain, as well as the development of university-internal support organizations.

In the first phase of the project, a model was developed for how competence development can be conducted sustainably. This model contains two perspectives: (1) an organizational perspective that focuses on the key partners to be involved; and (2) a process perspective that focuses on activities and aims in strategic competence development projects.

The preliminary model with its two perspectives is described and discussed in this article as a preliminary result. A more thorough evaluation of the model is planned as a next step in the HEaD project and thus lies outside the scope of this work.

Preliminary findings

To maximize chances for a long-term viable solution, one point of departure for the model is to make use of existing resources. This has been considered both in the organizational perspective, as well as the process perspective of the proposed model. As such, the model is built around organizational units that are typically found in university contexts, as well as activities that may already exist and can be complemented with new activities.

Furthermore, to be viable, it is believed that value must be generated in a nexus and at different levels in the organization. Values should be identifiable for individuals, groups or organizational units, as well as on the university strategic level.

Organizational perspective

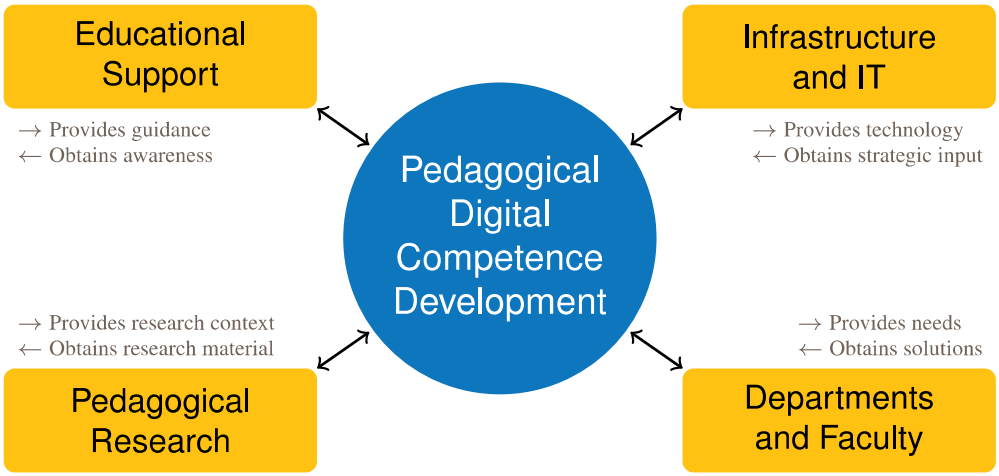

Figure 1: organizational model for Pedagogical Digital Competence Development

Figure 1 depicts an organizational perspective of the proposed model. This perspective includes key entities that are supportive for a strong pedagogical digital competence development. The figure, moreover, includes what each entity provides to the competence development project, as well as what it gains from its participation. This is of particular importance if the proposed project should be viable in the long-term. By identifying intrinsic motivations for each entity, participation can more easily be motivated from existing work plans and budgets, and thus require little – or potentially no – additional funding.

The four identified key entities and their roles in pedagogical digital competence development are:

- Academic departments and their faculty, who have the clearest benefit from a pedagogical digital competence development project, as it addresses the faculty's competence development needs and supports them to find potential solutions to existing challenges.
- Educational support unit, which has a clear assignment to support the university's faculty in regards to pedagogical competence development. This entity thus provides guidance and pedagogical expertise, and obtains in return awareness of development needs and timely challenges to be incorporated in other development activities (e.g., staff courses, workshops, etc.).
- Infrastructure and IT unit, which can provide infrastructure and technology, as well as a related competence. For pedagogical digital competence development, this contains inputs on opportunities and limitations of state-of-the-art technology and tools. In return, this entity can obtain input to strategic decisions on next-generation infrastructure and IT, which are deeply rooted in the faculty's needs and preferences.

- Pedagogical research unit, which contributes with a state-of-the-art pedagogical competence, as well as novel methods and approach. This entity gains in return new material and cases to conduct further research on, and initiates new collaborations with faculty that wants to perform research on their own teaching practices.

Process perspective

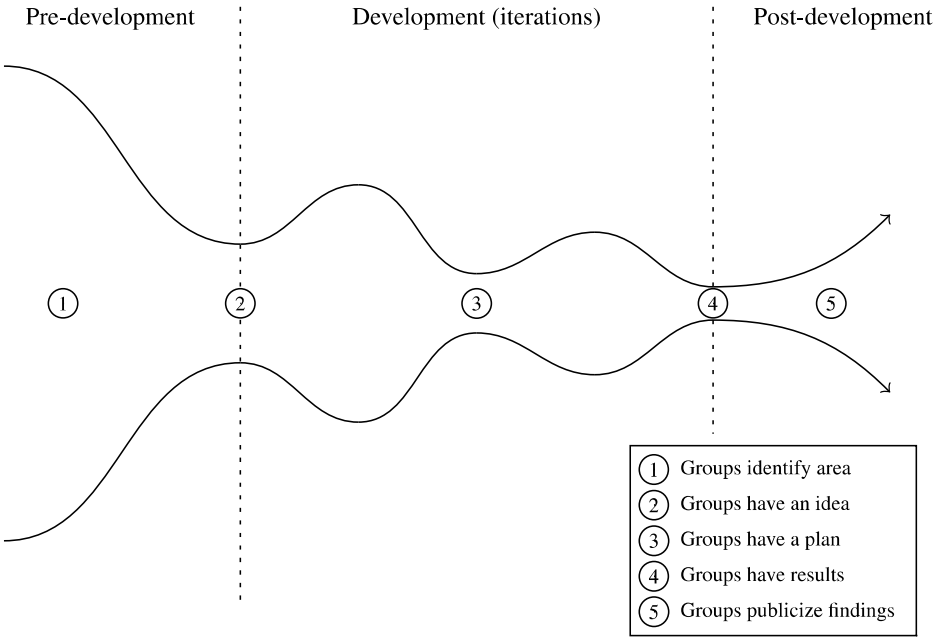

Figure 2: Process model of Digital Pedagogical Competence Development

To provide an additional benefit, the competence development project is organized around concrete pedagogical development projects on TEL-related topics. As such, an inherent motivation exists for participants to be actively involved in the project. Each year, a set number of pedagogical development projects are initiated. These projects are proposed by faculty based on current needs and challenges, which improves chances for a wider participation. In addition, a call for specific development topics may be initiated at the central level of the university based on strategic development needs.

Figure 2 depicts a process model of development projects over time from the perspective of the participants. Again, it is important that the support of faculty undergoing this process is to a large extent based on existing support structures, complemented with activities that can be sustained after the HEaD project ends. Therefore, a large portion of the support provided during the pedagogical development work (i.e., development phase in Figure 2) is given in the context of a course for university faculty. Through this course, a common structure for each development work is provided, and participants are guided through a process from idea to result. Moreover, resources for the support are thus provided through those resources already allocated for staff competence development courses. The process of the proposed course is inspired by the Design Thinking method (Henriksen et al., 2017), and the stages of divergence and convergence that participants undergo during this process are indicated in the figure. Different course activities – that aims at strengthening both individual competence and teachers' professional network– such as study group discussions and work assignments, help the participants to diverge and converge over time.

Figure 2 indicates that support also needs to be provided before and after participants conduct their development work. In the pre-development phase, support is mainly required to help educational environments (e.g., teams of teachers in courses, programs or subjects) to identify relevant areas for their development work. These areas can be selected strategically based on the needs of individuals or collectives, such as groups, subjects or departments. A systematic inventory of development needs can for example be accomplished by self-guided workshops (e.g., based on backcasting (Robinson, 1990) and seed-thinking methods) or self-assessment exercises, such as those included in the European DigCompEdu framework (Redecker, 2017). In the post-development phase, support in result dissemination is of primary concern. This can deal with networked methods such as university-internal

dissemination (e.g., at an internal pedagogical development conference), or a wider dissemination at external conferences and/or in relevant journals. For the support in this phase, the involvement of pedagogical research units is important, and activities could include seminar series or workshops on academic writing.

Conclusions and further directions

In order to facilitate sustainable pedagogical development, it is of great importance that the result of the project remains after the project ends, both when it comes to development initiatives and an infrastructure to support these initiatives. One overarching goal of the HEaD project is to become a glue in nexus of existing structures, efforts, and organizational units.

The HEaD model provides an example of how the interplay between key actors within the university contributes to developing teachers´ digital pedagogical competencies. It identifies key components of an organizational model for Digital Pedagogical Competence development. The interplay and the described infrastructure depicted in Figure 1 corresponds well to research on university teachers` learning paths during technical innovation. Van der Rijst et al. (2019) conclude that university teachers mainly learn through doing teaching, experimenting, and reflecting on their teaching and not as much through workshops and training sessions. The HEaD model supports the co-creation of development in collaborative groups of teaching staff, academic developers, researchers, and IT-staff. Each development project constitutes a needs-adapted space where collaborative development takes place in-time and on-the-spot (van der Rijst et al., 2019).

In order to sustain pedagogical development project initiatives in regular operations, making use of existing university infrastructure is essential. The model proposed in this paper is organised to align with existing functions, structures, and networks. Setting up and sustaining this model relies on for example coordination and facilitation capacity, organizational legitimacy, engagement, and organizational support.

The capacity to coordinate the different functions involved in a pedagogical development project and facilitate learning processes is in the model proposed to be allocated to the educational support unit. In a systematic review of team-based professional development interventions in higher education, Gast et al. (2017) mean that an external facilitator of group learning processes is argued for in most research. In the case of the HEaD-project, the unit for educational support constitutes a node in a network that facilitates and coordinates educational development.

Organizational support can be manifested through for example explicit time allocated for participation and recognition for team efforts and achievements (Gast et al., 2017). Hence, a stable financial model for development projects can be translated into “protected time” for participants during the process, which legitimizes work on the projects in relation to colleagues (Bolander Laksov, et al., 2020). Also, the co-existence with the system for teacher accreditation feeds into the recognition of individual achievements and the suggested dissemination of results through internal or external conferences or scientific journals reinforces the recognition of team achievements.

According to Bolander Laksov, et al (2020), the issue of legitimacy for pedagogical development initiatives depends on the explicit support from organizational management. In the case of the HEaD-project, the support from organizational management is proposed to be manifested in the university central quality system where pedagogical development projects are suggested to be an integral part.

One consequence of the suggested way of organizing for pedagogical development is that the project focuses on the long-term development of university education from an organizational perspective. There is a risk that the importance of or the need for individual teacher’s competence development is toned down or set aside for the benefit of the strategic needs of the university. Roxå and Mårtensson (2017) propose that an important task for educational developers is to scaffold conversations between academic teachers to make these conversations informed, critical and transformative. Accordingly, conversations will over time grow in frequency and in quality (Roxå & Mårtensson, 2017). In this line of reasoning, the proposed model for the development of digital pedagogical competence encourages such conversations. Throughout the process of each development project, the model allows for conversations between teachers, academic developers, researchers within the field of TEL and IT-personnel. These conversations are formally organized along the process model (see Figure 2) but conversations beyond the model are also encouraged and facilitated through for example the possibility for teachers interested in a particular development project to follow and interact with the project. When it comes to teacher engagement in development projects, Bolander Laksov et al. (2020) point out that meaning making and motivation is based on the participants’ opportunity to choose. The individuals` feeling of autonomy and competence is likely to lead to

increased engagement. The proposed model encompasses a large element of individual or team agency when it comes to for example identifying and developing the project, selecting methods or tools, and customizing project pace.

The development projects provide important knowledge, suggestions, and input about the needs of the teacher that for example the IT-department can use for developing services, buying licenses, and providing support. Positive networked synergy effects between support functions and teachers are expected. In this line of argument, circular development, and building of a strong network that enables synergies between support functions, research units and academic teachers, of educational quality can be expected.

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DIGIFLEX - from flexible and digital courses to an overall networked learning perspective on digital course design

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Abstract

The digital two-way communication that society expects today can be said to blur the boundaries between the universities and the surrounding society. As the campus becomes more of an open network, the gap between formal and informal learning narrows. One can see a shift towards a perspective of lifelong learning with a more social and global perspective. Seen in that perspective, higher education has a greater value for people, than just specific skills or a specific degree. How people in society interact with various groups and organizations on social media also demonstrates this development and it challenges how we traditionally view learning. It also affects how the university conducts course design. Students and educators have come to expect the use of new digital tools. Many of these tools contribute to interaction between educators and students in collaborative learning. In a societal perspective we see a two-way exchange of meanings and needs, which makes it possible to create solutions that neither the university nor organizations in society could have adopted on their own. The focus of this paper is the course design process of a commissioned education course, DIGIFLEX. The practice meanings from students, colleagues and a reference group are referred to as feedback loops. These feedback loops continuously drove the course design and development forward and clearly indicated the need for an adaption to a more societal context. The design process is described via three stages and two feedback loops. The first stage focused on finding a modern digital design with lots of audiovisual elements for short and flexible courses. In the first feedback loop, we gained inspiration via a learning technology conference, which led to sessions with reverse brainstorming where the project group further challenged the standard norm for course design. In step two, the pilot course was implemented with the new elements generated from the first feedback loop. We received support from a reference group with expertise in networked learning and the students evaluated the course. Our findings show a need for more dialogue and informal structure as complement to the existing digital course design. This insight was confirmed by the experiences and lessons learned from distance education during the pandemic. There is a need for a networked learning perspective in this kind of digital course design. More frequent reconciliations, evaluations of needs and expectations from the surrounding society is important for the success of similar projects in the future.

Keywords

Audiovisual Learning Resources, Digital Course Design, Lifelong Learning, Networked Learning

Research Context

People and society today expect digital two-way communication and this digital two-way communication can be said to blur the boundaries between higher education institutions and the surrounding society. The conditions for lifelong learning in higher education are affected when technology becomes a natural part of the course design. (Jaldemark, 2021, p. 33–35). As a result of the networked perspective on learning, it becomes obvious that new and innovative ways of conducting distance education are welcomed. Through a two-way exchange of meanings and needs, it is made possible to create solutions that neither the university nor organizations in society could have embraced on their own. Students can then gain practical knowledge that cannot come from a purely formal environment at the same time as they can gain theoretical perspectives on knowledge that could not have been obtained in their workplace (ibid, p.37).

The challenge for higher education with creating digital active learning environments partly has to do with financial and organizational issues, but also with the development of suitable technological solutions and how to engage both students and educators in the process (Børte, Nesje & Lillejord, 2020). Even so, one can clearly argue that the barriers are more about pedagogy than technology (Kirkwood & Price, 2013). There are also a large group of educators that don't see their need for pedagogical development (Newland & Byles, 2014). The shift to active learning with new technologies requires for the educators to analyze and focus on the student learning needs instead of just relying on their own expertise (Walker, Jenkins & Voce, 2017). This way of thinking about teaching and learning also requires competence when it comes to learning design. By working with collaborative learning via various technological solutions, higher education can make it easier for students to set common goals and to share learning space in a new way. New technical solutions (wikis, blogs and cloud solutions) have contributed to a change in how educators and students interact with each other and what the learning process looks like (Zheng, Niiya & Warschauer, 2015).

Social media is one area where students and educators, higher education and society can interact with each other. Social media therefore can be seen as a hybrid space of activity for a large number of various producers and consumers. (Guerin, Aitchison & Carter, 2020). Networks of learners grow online at the same time as academics become more active as content writers and consumers. Higher education can in this perspective be seen as an e-learning trading zone. When the digitalized academy is seen as more of an exchange, traditional teaching and learning power hierarchies are destabilised (Nørgård, Mor, & Bengtsen, 2019). Viewing the university campus or classroom as an open network recognizes its contacts with various individuals and organizations in the society and contributes to a transformation from skills factory to an ecological network. It also means that higher education has a greater value to people, than just specific skills or a specific degree (Goodyear, 2019). This can be interesting to relate to the definitions of formal and informal learning and also to lifelong learning, an area that combines several aspects of formal and informal learning and also adds a social and global perspective (Jaldemark 2021).

Aims and Research Questions

Based on a digital course project during the pandemic, this paper aims to analyze how the digital course design process was affected by the societal context. It answers the following research questions:

- How has the digital course design process developed through various feedback loops?
- In what way can one explicate the importance of a networked learning perspective for future digital course design projects?

The DIGIFLEX project

DIGIFLEX started out a concept for commissioned education, which is a growing area in higher education in Sweden. Higher education in Sweden is free, but there is a demand from the society for shorter and tailor-made higher education courses for organizations. These courses (associated with a cost) are often referred to as commissioned education by Swedish universities (University of Lund, Umeå etc). The aim in our specific project was to produce shorter courses with free start, free speed and easy digital access. The idea was that students could watch short videos, listen to podcasts and join in on some of our optional seminars.

Methods

The project discussed in this article applies design-based research (e.g., Barab & Squire, 2004) and a learning through practice design (e.g., Hansen & Dohn, 2019). Design based research means that the research outcomes should result in a theory on learning and teaching (here defined as a lifelong learning perspective on networked education). As the project has developed, new impressions, knowledge and experiences have resulted in new design principles being implemented in the course design. In the pilot course in the project, the students have contributed to improving the content of the course in line with a learning through practice design. Learning through practice design means that students adapt their actions to the course objectives and that they then, without the teacher's intervention, use their results to get better (Laurillard, 2012, p. 162). Hansen and Dohn argues that when a student engages in a discipline's knowledge and skills, he or she can learn more than the knowledge and skills themselves. The resonant field of practice meanings, that the student develops, can be used to develop curricula and thus the content of courses. In this way, work practice can be used as a lever for participation and knowledge transformation in pedagogical practice (Hansen & Dohn, 2019, p. 130). In this paper, this work practice is called feedback loops.

Preliminary results

The course design development of DIGIFLEX and the findings regarding the impact of the societal context (from audiovisual demands to a lifelong learning perspective on networked learning) will be demonstrated and discussed through feedback loops.

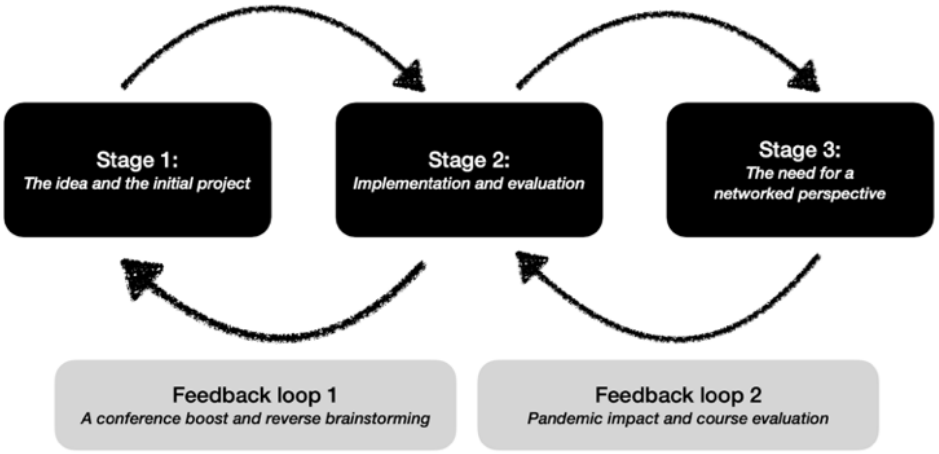

Figure 1: Course design development via feedback loops

Stage 1: A two-year project for flexible and digital commissioned education
After working many years in a text-based Moodle environment with lots of limitations regarding images, videos and design a couple of educators at our department started to feel that our course design was not in line with the students´ expectations. Considering the fact that the educators involved in the project actually teach skills like social media publishing, video- and podcast production it was clear that there was room for improvement**.** The pilot was set up as a Wordpress page, structured in modules for smooth navigation and designed to minimize long texts, focus on audiovisual elements such as short podcasts or videos. The visual language and how the viewer is addressed in a video has been important in the design process. The aim was to deliver the feeling of a YouTube-video or tutorial, rather than a traditional lecture more frequent reconciliations, evaluations of needs and expectations from the surrounding society is fundamental (with too many slides).

Feedback loop 1: A conference boost that led to reversed brainstorming
The projects educators attended the 2019 Association for Learning Technology conference in Edinburgh and were impressed by how far digital pedagogy had come in the UK and how technicians, pedagogical support teams, educators and students often worked together. These new insights led to a creative seminar with reverse brainstorming where the educators in the project identified what they did NOT want to see in the new course design: 1) A boring design in the digital environment. 2) No audiovisual elements. 3) Fixed dates for the course start and stop date, for lectures and exams.

Stage 2: Implementation of the DIGIFLEX pilot course
The pilot course in the DIGIFLEX project was set up as a Wordpress page that students got access to after buying the course. The website was designed to minimize long texts, focus on audiovisual elements and to create variation. Since this specific course was about videos for social media it mainly consisted of just videos. The course was structured in three basic modules for smooth navigation. The pilot course had participants from two different organizations. The project received support and nourishment for development and continuous evaluation through a pedagogical development project together with other similar projects. The support from the networked learning expertise within the project group was particularly valuable.

Feedback loop 2: Pandemic impact and course evaluation
When the pilot course was about to be completed, we were in the middle of the covid-19 pandemic. The effects the pandemic had on our project could not be predicted, and several of DIGIFLEX's unique selling points were overturned. Suddenly everyone was forced to quickly learn how to produce films with decent results. In that sense, the project idea wasn’t as unique anymore and there was no longer the same expectancy for technical perfection.

The most important was to get something done and to establish a dialogue. The quality of the work (videos, digital design) seemed to develop as everyone learned for themselves and from each other. The direct indictment was still very important. These pandemic experiences can be summed up in a conclusion we did not really anticipate; how important dialogue is. This conclusion was reinforced by the pilot course evaluation and the voluntary workshop, both of which showed the need for dialogue. This is a quote from the course evaluation: ”The seminar with the teacher and the other students was very rewarding. It gave me inspiration and a whole new understanding on how to think”. This feedback demonstrates the importance of human contact and dialogue in a digital learning process, regardless how well thought out the course design is otherwise.

Discussion: current state and the need for a networked perspective

The initial focus of the project for commissioned education was to meet the target group's demands for an attractive and functionally efficient digital environment inspired by social media and external actors outside the education sector. The projects concept with modular thinking for smooth navigation and designed to minimize long texts and a focus on audiovisual elements proved to be right on time. We currently need to adapt some changes from the second feedback loop. Our findings indicate that the need for dialogue has increased during the pandemic. While the module structure will remain, the view of dialogue will be the subject of the next feedback loop. The pandemic reinforced the two-way perspective because since the majority, now accustomed to various technical solutions, felt an increasing need for more dialogue in the digital context. The project gradually shifted from a design perspective, with focus on a modern and appealing digital course design, to a societal, interpretative perspective of dialogue, collaboration and networking. The theoretical framework of education and course design is developing towards a networked and lifelong learning perspective with other motivational forces for learning than we traditionally have seen (grades, credits and degrees). Our conclusion is that an attractive learning platform isn’t enough, even if it is important to emphasize the need to adapt the learning platforms to an audiovisual expression that reminds more of social media platforms than traditional learning platforms. It is also desirable to use a more informal and direct linguistic approach rather than a formal approach. Another conclusion that could be applied on future development projects is that more frequent reconciliations, evaluations of needs and expectations from the surrounding society is fundamental. By continuously exchanging opinions and sharing needs in a societal network it is possible to create a type of education (eg commissioned education) that neither the university nor other organizations in the surrounding society could have created on their own.

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The potential for Networked Learning in Environmental Assessment teaching in Sweden

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Abstract

This paper explores the current teaching of Environmental assessment (EA) in Sweden. EA processes aim at identifying the potential advantages and disadvantages of a proposed action mainly applied in physical landuse planning and for the approval of projects. EA not achieving best practice has been an issue within research for a long period of time. At the same time, the competence requirements on EA practitioners are very high. Recent court verdicts have raised a concern about the competence status among Swedish practitioners in the field of EA.

The aim of this paper is to explore and analyse the current teaching in EA in Sweden in order to develop this field through influence from other disciplines, in this case Network Learning (NL). The paper builds on two different analyses. The first being an analysis of Swedish EA courses. The second being a comparison of the International Association for Impact Assessment (IAIA) Best Practice Principles for Teaching, and the Design dimensions for NL.

The analysis shows that most of the courses are leaning more towards practical training than integration of research contribution and research training. This means that there is a risk that the students will leave the university with a low absorptive capacity. The analysis has also identified that vital competences are lacking in current teaching. These are the awareness of EA being an interdisciplinary process and integrative and systems thinking. This despite, the ability to synthesize information from different sources to develop a holistic understanding is central to EA practise.

The comparison with the design dimensions for NL experiences shows a clear correlation with the category pedagogy of the IAIA Principles an indirect correlation with content and skills. The social dimension in NL is not visible in the analysed course syllabuses, and notions of conflict management and reflective practice are weak.

The backbone of EA teaching is the same in all countries and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger teaching communities in the field of EA teaching. Therefore, network learning offers a potential for EA teaching, bridging the gap between theory and practice.

Keywords

Environmental Assessment, Networked learning, Knowledge and learning.

Introduction

Environmental Assessment (EA), including Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA), is a forward-looking process of identifying the potential advantages and disadvantages of a

proposed action thereby assisting decision-makers (IAIA, 2009; Partidário, 2012). EA is mainly applied in physical landuse planning and for the approval of projects (e.g. road, rail, energy transmission) and various permits (e.g. water works, factory operations). EA has a dual nature, each with its own methodological approaches (IAIA, 2009):

- an analysis of the consequences of a planned intervention (policy, plan, program, project), providing information to stake-holders and decision makers; or unplanned events, such as natural disasters, war and conflicts.
- a legal and institutional procedure linked to the decision-making process of a planned intervention.

The first regulation on EA came through the Natural Environmental Protection Act in the USA in 1970 (UN Environment, 2018). Since then, most countries in the world have adopted legislation on EA (Wood, 2003). EU adopted a Directive on EIA in 1995 and a second Directive on SEA in 2004. Sweden introduced formal requirements on EIA during the 1990s and SEA in 2004 (Faith-Ell, 2015). Since then, the EU Directive on EIA has been amended several times as well as the Swedish legislation. In the last amendment in 2017 a requirement on the competence of the EIA practitioner was introduced in order to improve the quality of EIA (Marmefeldt, 2016).

Kågström (2016) and Balfors et al. (2018) show that the issue of EA practice not achieving best practice has been an issue within EA research for a long period of time. At the same time, the dual nature of EA means that the competence requirements on EA practitioners are very high. They are expected to have a general understanding of a variety of environmental aspects as well as technical details of e.g. road engineering of agriculture, leadership skills, communication skills when it comes to public consultation, and EA theory and legislation. Kågström (2016) shows in her research that an important group of practitioners in the performance of EA is consultants. Furthermore, the quality performance was strongly influenced by practitioners' perceptions of appropriate action (Kågström, 2016). This is supported by other studies that EA practice and implementation is influenced by interrelations (Kørnøv and Thissen, 2000), norms (Blicharska et al., 2011) and subjective informed judgements (Ehrlich and Ross, 2015) of the actors involved and their use of discretion (Kørnøv et al., 2014). However other important groups influencing the performance of EA are County Administrative Boards, Municipalities and proponents (Isakssson et al. 2009). The variety of skills and parties involved in EA has led to a wish among Swedish EA practitioners for an arena for reflection of their own practice (Balfors et al., 2018). Furthermore, following recent court verdicts, concerns have been raised, in the Swedish debate on EA quality regarding the competence weaknesses among Swedish EA practitioners. Examples of court cases are the rejections by the Environmental Court for i) the extension of a calcite quarry at Slite (the so called ‘Cementa case’) (Mark- och miljööverdomstolen, 2021), and ii) the extension of the Kirunavaara mine (Mark- och miljödomstolen, 2021). Both cases were rejected due to basic omissions in the court applications.

All this together, have led to a situation in which various players have brought forward the need for arenas where practitioners can meet and learn outside of the framework of their regular professional roles. Lifelong learning covers the whole range of learning that includes: formal, informal and non-formal learning. Lifelong learning in the sense of professionals returning to organised learning has been described as a process that includes people learning in different contexts. The issue of teaching and learning has been discussed within the field of EA since the introduction of NEPA (Morrison-Saunders et al. 2020). However, compared to other professional fields it is underexplored (Sanchez & Morrison Saunders 2010; Morrison-Saunders et al. 2020). EA is a member of the larger family of impact assessments, and in the year 2018 the International Association for Impact Assessment (IAIA) published Best Practice Principles for Impact Assessment Teaching and Training (Pope & Morrison-Saunders 2018; Morrison-Saunders et al. 2020). The IAIA Principles builds on three main categories representing different dimensions of teaching impact assessment; content, skills, and pedagogy (see Table 1 below).

Both the pedagogical traditions in the Swedish EA community and the sustainability teaching at Mid Sweden University derives from a practical approach (Faith-Ell & Loungeville, 2021; Loungeville & Faith-Ell, 2021). Due to the societal need to move in a more sustainable direction has the aim at Mid Sweden University been to create a pedagogy that will foster independent and problem-solving students, since the early 1980s (Grönlund et al, 2021). The education has also been in a blended format for more than a decade and this practise is influenced by the community of inquiry (CoI) framework developed by Garrison, Anderson, and Archer (2000).

Network learning (NL) as research field and practice emphasis on collaborative learning and recognises the importance of human relationships and collaborative engagement in learning communities, as well as how

technology shape human activity and are shaped by human activity (Networked Learning Editorial Collective, 2021). In Table 1 in Networked Learning Editorial Collective (2021), the part by Rodríguez-Illera and Barberà, presents and describes design dimensions for NL experiences are (see Table 2 below). There are several similarities between the research and practise of the EA community and NL, for example the processes of collaborative, co-operative and collective inquiry, that is vital in EA practise. The EA community therefore seems to have much to learn from NL when it comes to further improve practise concerning how to strengthen the capacity to work creatively in creating knowledge, collectively identify problems and the resources to develop solutions and in doing so, building trusting relationships, motivated by a sense of shared challenge. Given the current developments in society and the commitment to equity and social justice, NL is both in line with the ambitions of the EA community and the sustainability teaching traditions at Mid Sweden University. This has however not been explored or analysed before.

Aim

Mid-Sweden University has initiated the development of a course for EA practitioners in Sweden. One reason being that none of the previous two courses for practitioners are active. One of the tasks within the project has been to evaluate the current teaching within the field of EA in Sweden. The aim of this paper is thus to explore and analyse the current EA teaching in Sweden in order to develop this field through influence from other disciplines, in this case Network Learning. The paper builds on the following research questions: i) How well does EA curriculums at Swedish Universities correlate with the IAIA Best Practice Principles for teaching and training? How do the IAIA Principles stand with regards to other principles i.e. the Design dimensions for Network learning experiences?

Method

The paper builds on two different analyses. The first being an analysis of EA courses in Sweden. The second being a comparison of the IAIA Principles and the Design dimensions for Network learning experiences by Rodríguez-Illera and Barberà (2021).

The data for the analysis of the EA courses consisted of course syllabuses collected from the websites of the different universities, minutes from the recently started Swedish network of EA teachers as well as field notes from the meetings with the group during 2021. In all, 22 courses were identified. Of these, the course syllabuses of 19 courses were analysed. The reason for excluding five courses were lack of information on the websites (three cases). The analytical framework used for the analysis was based on the IAIA Best practice principles (Morrison-Saunders et al 2020) (Table 1).

The second analysis was a qualitative comparative analysis of the IAIA Principles with the Design dimensions for Network learning experiences by Rodríguez-Illera and Barberà (Networked Learning Editorial Collective et al., 2021) (Table 2). The aim of the analysis was to identify potential correlations between the two sets of criteria. The visualisation of correlations was made through the application of Sankey diagrams. Sankey diagrams are normally used in order to visualise flows e.g. energy (c.f. Schmidt 2008). However, in this paper the Sankey diagrams have been applied with the intent to visualise correlations.

Content	Pedagogy	Skills
(1.1) Integrates the theory and practice of impact assessment *Practical aspects are discussed with emerging research in the field.*	**(2.1) Is tailored to the context, needs, and capacities of learners** *The requirements of learners are ascertained in advance and the course is designed to meet these.*	**(3.1) Integrative and systems thinking** *The ability to synthesize information from different sources to develop a holistic understanding.*
(1.2) Incorporates research contributions *Learners engage with emerging research in the field.*	**(2.2) Is flexible** *Teachers/trainers adapt to the emerging requirements of learners as the course progresses.*	**(3.2) Critical thinking** *The ability to make reasoned arguments based upon critical evaluation of information.*
(1.3) Presents international best practice principles *Learners are aware of what constitutes international best practice, regardless of the specifics of the impact assessment systems within which they operate.*	**(2.3) Facilitates co-learning** *The knowledge and experience of the learners is drawn upon to complement those of the teacher/trainer.*	**(3.3) Judgement** *The ability to make decisions in situations of uncertainty, incomplete information, and competing values.*

(1.4) Presents the requirements of specific standards, regulations, or procedures relevant to the participants *Learners are familiar with the specifics of the impact assessment systems within which they operate.*	**(2.4) Simulates key features of impact assessment practice** *Pedagogy incorporates features such as teamwork, communication, transparency, accountability, peer review.*	**(3.4) Written communication skills** *The ability to prepare written materials in a clear and logical way that is comprehensible to non-experts.*
(1.5) Explores professional ethics *Learners are prepared to face ethical dilemmas and are aware of expected professional standards.*	**(2.5) Provides opportunities for discussion and debate** *Learners are encouraged to participate, challenge, and share views.*	**(3.5) Oral communication skills** *The ability to engage in meaningful two-way communication with a variety of different stakeholders.*
(1.6) Positions EIA as an interdisciplinary process *Learners are aware that impact assessment integrates different forms of knowledge.*	**(2.6) Utilizes case studies** *Actual or hypothetical examples of impact assessment practice are provided to illustrate concepts and as the basis for practical exercises.*	**(3.6) Collaboration and teamwork skills** *The ability to work in diverse, interdisciplinary teams.*
(1.7) Presents impact assessment as a pluralistic process *Learners are aware that impact assessment engages with multiple stakeholders with different values and perspectives.*	**(2.7) Provides opportunities to gain practical experience** *Activities reflect the realities and complexities of impact assessment practice.*	**(3.7) Project management and coordination skills** *The ability to manage a team and complex tasks to achieve a defined goal.*
(1.8) Presents impact assessment as being both socio-political and technical in nature *Learners are aware that impact assessment is both an art and a science.*	**(2.8) Facilitates self-learning** *Learners are encouraged to apply concepts to their own contexts and to reflect on their personal learning processes.*	**(3.8) Research skills** *The ability to formulate, conduct, and report on research.*
(1.9) Fosters sustainability-oriented norms and values *Learners are prepared to be advocates for the environment and sustain- ability.*	**(2.9) Is memorable and fun** *An enjoyable learning environment is created.*	**(3.9) Job readiness** *The practical skills required to coordinate an impact assessment in a professional setting.*
(1.10) Provides practical methods and tools *Learners leave the course with a 'tool kit' they can apply in future work.*		

Table 1: Categories of Best practice teaching of impact assessment (Pope & Morrison-Saunders 2018; Morrison-Saunders et al. 2020).

A. Facilitation	*To what extent were there facilitators working directly with learners?*
B. Openness	*To what extent was the learning experience open to any participants outside an institution, and were materials openly accessible?*
C. Structure	*To what extent was there structure that was planned and followed?*
D. Voluntariness (related to structure)	*To what extent was participation of learners' voluntary versus part of something mandatory*
E. Linearity (related to structure)	*To what extent does the learning experience flow in a particular order?*
F. Certification	*Was there certification at the end for completion? How formal is this certification (e.g. accredited, assessed, informal?)*
G. 'Eventiness'	*To what extent are there clear deadlines and timed commitments?*
H. Content vs process	*To what extent is the learning experience designed around content/learning outcomes vs process goals? (Smith 2018)*
I. Homogeneous learning path versus autonomous pathways	*Is there just one pathway or multiple? (see Crosslin 2018)*
J. Playfulness	*To what extent were 'fun'/elements of play used?*
K. Collaboration	*To what extent is collaboration built into the design of the learning experience?*

L. Affective	*To what extent is the affective dimension of NL encouraged, emphasised, recognised or centred?*
M. Socially just economically	*To what extent is the networked design emphasizing economic social justice principles, using tools and technologies accessible to a broad range of target learners with different infrastructure supports?*
N. Socially just culturally	*To what extent is the networked design emphasizing cultural social justice principles? Is there representation from diverse and especially marginalised cultures?*
O. Socially just politically	*To what extent is the networked design emphasizing political social justice principles? Are there diverse learners/teachers involved in the design of the learning experience? How much power do they have in decision-making 'parity of participation'? (Fraser 2005)*

Table 2: Design dimensions for NL experiences (Rodríguez-Illera and Barberà (Networked Learning Editorial Collective et al., 2021). (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

Results

The analysis shows that there are 12 courses solely dedicated to EA and in nine courses where EA included as a part of the course. Most (17) courses are on campus, two courses are online and two in blended format.

Content

Figure 1 shows the result of the analysis of the course syllabuses with regards to the category 'Content' in the IAIA Principles. The analysis shows that the majority of the courses focus on both theory and practice of EA (1.1). The principle 'Requirements of specific standards, regulations, or procedures relevant to the participants' (1.4) is also central in the majority of the courses. Also, 'Fosters sustainability-oriented norms and values' (1.9) and 'Provides practical methods and tools' (1.10) are common in the syllabuses. Principles that are not that common in the syllabuses are 'Incorporates research contributions' (1.2), 'Presents international best practice principles' (1.3), 'Explores professional ethics' (1.5) and 'Positions EIA as an interdisciplinary process' (1.6).

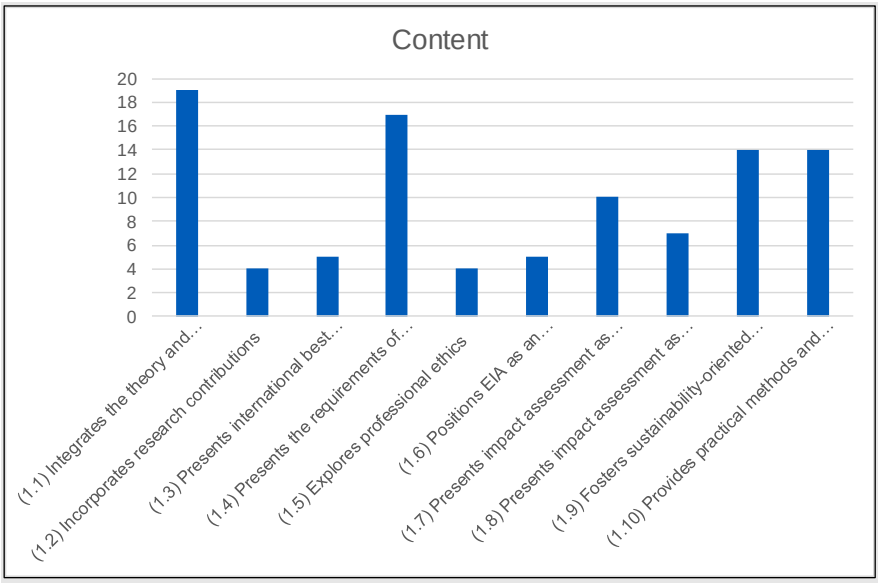

Figure 1: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Content in IAIA Best Practice principles.

Pedagogy

Figure 2 shows the result of the analysis of the syllabuses with regards to the category 'Pedagogy' in IAIA Principles. Principles 2.1, 2.2 and 2.9 could not be found in the syllabuses. The weakest principle apart from these

three was ‘Facilitate self-learning’ (2.8). The other principles in the category are found in most of the studied syllabuses. Furthermore, it is clear that the EA courses are based on teamwork and case studies and focus on the practical execution of EIA.

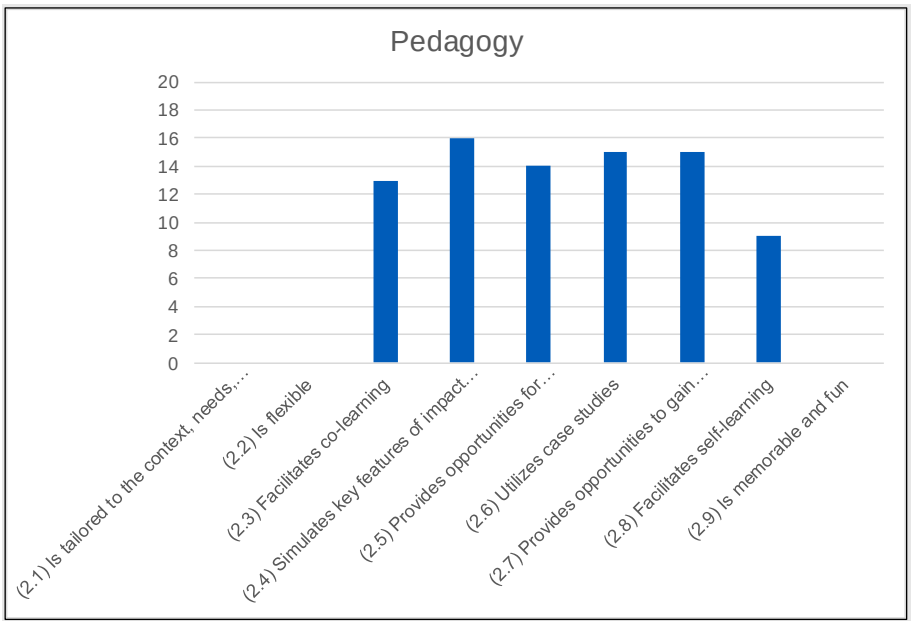

Figure 2: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Pedagogy in IAIA Best Practice principles.

Skills

Figure 3 shows the result of the analysis of the EA syllabuses with regards to the category ‘Skills’ in IAIA Principles. The analysis shows that five principles are well represented in the syllabuses. These all categories represent basic skills that are taught at all university educations in Sweden and is not unique for the field of EA. The skills that are more EA specific are not taught to any extent according to the syllabuses.

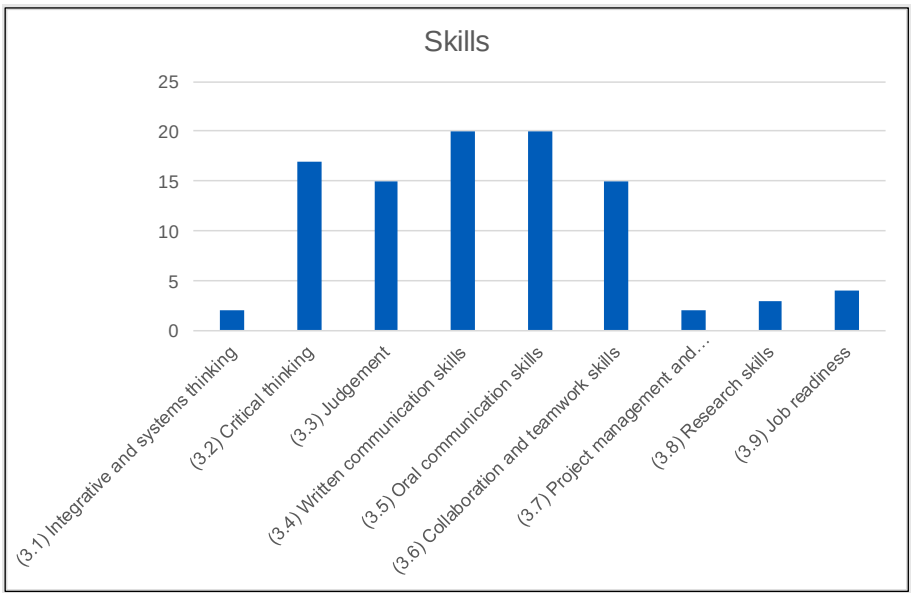

Figure 3: Result of the analysis of EA syllabuses at Swedish universities with regards to the category Skills in IAIA Best Practice principles.

Comparison

The comparison of the IAIA Principles and the Design dimensions for NL experiences shows that there is a direct correlation between the IAIA category Pedagogy and about 50 percent of the NL Design dimensions (Figure 4). All but one principle (2.8) in the category Pedagogy correlates to one or more NL Design dimensions.

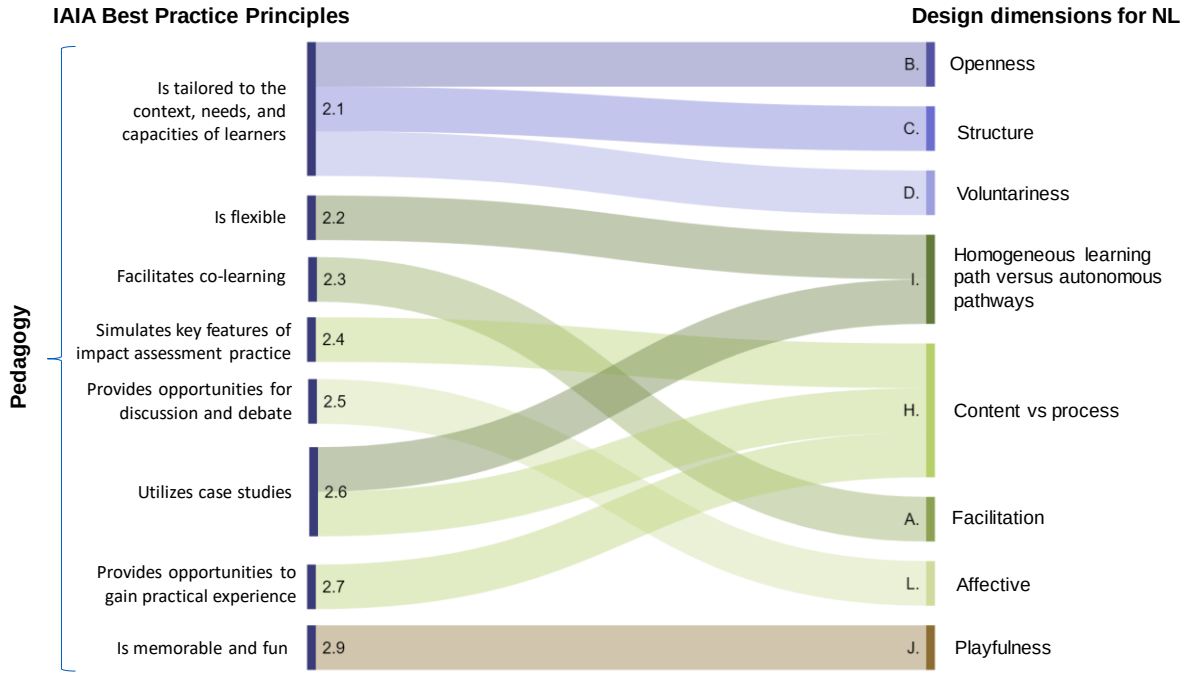

Figure 4: Direct correlations in the comparison of IAIA Best Practice Principles and the Design dimensions for NL. (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

The other 50 percent of the NL Design dimensions correlate indirectly to some of the IAIA principles in the categories Content and Skills (Figure 5). By indirectly, we mean that these NL Design dimensions could not be found explicit in the IAIA principles for Pedagogy but could be found in the two other categories. Still, more than half of the principles of the IAIA categories Content and Skills respectively do not correlate to any of the NL Design dimensions.

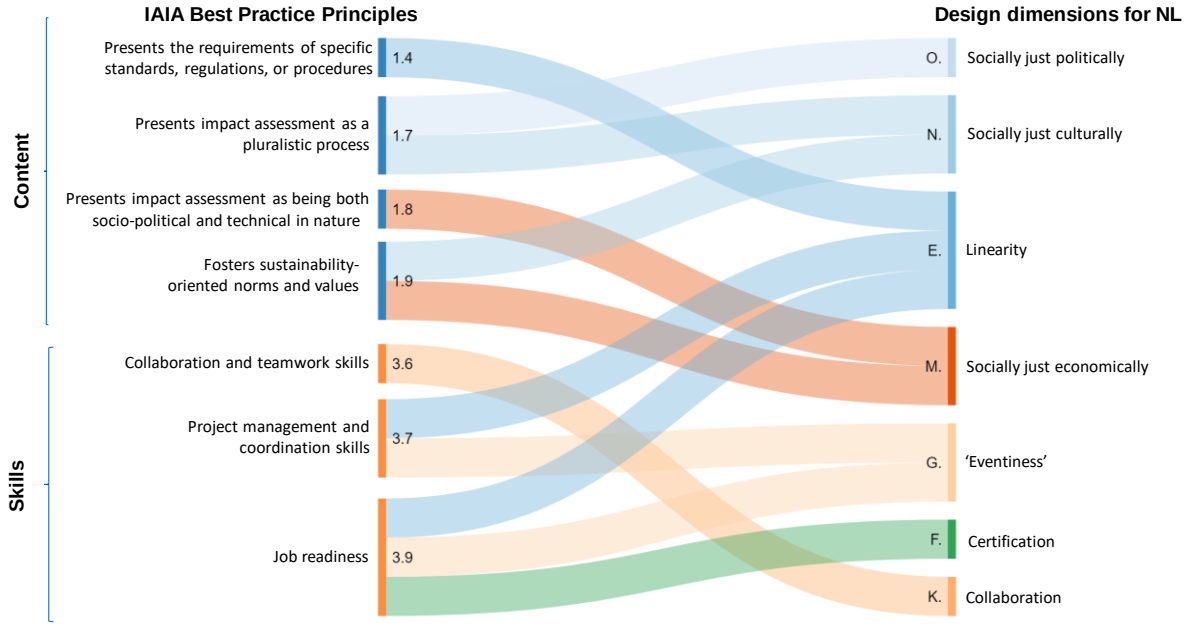

Figure 5: In-direct correlations in the comparison of IAIA Best Practice Principles and the Design dimensions for NL. (N.B. The letters signifying the NL dimensions have been added by the authors in order to simplify the Sankey analysis).

Discussion

Impact assessment at Swedish Universities

The analysis shows that there are no candidate or master programmes in Sweden solely aiming at EA. Instead, the students gain knowledge in EA through individual courses or as a part of broader courses aiming at various tools within the field of environmental science. I.e. it is the pedagogical layout of the entire programmes that forms the students. This result corresponds to the experiences of teaching EA in Canada (Stelmack et al. 2005) and Portugal (Ramos et al. 2008). Furthermore, the result emphasises the importance of the teachers of EA courses being a crucial part of the planning and development of the programmes. Something that the members of the Swedish EA teacher network are well aware of, however with varying possibilities to influence.

Generally, the dual nature of EA being both a process for analysis of the consequences of a planned intervention, and a legal and institutional procedure linked to the decision-making process is reflected in the syllabuses. It is clear that the courses are mixing theory and practice. At the same time, the analysis shows that most of the courses are leaning more towards practical training than integration of research contribution and research training. One possible explanation for this is that there is very little research in EA at the majority or the universities that teach EA. In reality, the majority of the EA research is carried out at three universities in the country. This can also be seen in the results where the course syllabuses from these three universities are the ones that state that research results are incorporated in the teaching (Figure 2). Weaknesses in EA research experience among EA teachers correspond to the situation in Spain (Enríquez-de-Salamanca, 2019). A second explanation could be that when EA was introduced in Sweden, it was first taught at departments with a traditionally had a very strong focus on practical applications e.g. engineering and law.

The lack of integration of research results is interesting from the perspective that the practice constantly changes due to new insights from research but also due to changes in society including the EU legislation. EA as a research field but also practical field have changed considerably since its introduction in the early 70-ies.
This means that there is a risk that the students will leave the university with a low absorptive capacity.

The principles 'Is tailored to the context, needs, and capacities of learners' (2.1) (also emphasising the need identified above of close collaboration between EA courses and full programmes), 'Is flexible' (2.2) and 'Is memorable and fun' (2.9) could not be found in the syllabuses. However, this is usually not something that would naturally be a part of a syllabus. Therefore, it should not be considered as a shortcoming. In order to get a valid

answer to the incorporation of these principles other methods would be needed for example analysis of course evaluations. Also, for the other principles course evaluation analysis and interviews would bring a richer understanding of the state of the art of EA teaching in Sweden. This is something that should be explored further in the future.

Vital competences lacking in current teaching

The IAIA Principles indicates, for each principle, if it is very important or extremely important for teaching and/or training. Most of the principles that are considered extremely important for teaching are covered in the EA teaching at Swedish universities. However, the analysis shows two areas that are lacking in current teaching at almost all studied universities are: i) research: 'Incorporates research contributions' (1.2) and 'Research skills' (3.8), and ii) the complexity of this field: 'Positions EIA as an interdisciplinary process' (1.6) and 'Integrative and systems thinking' (3.1). The incorporation of emerging research in the field and the awareness of EA and the ability to synthesize information from different sources to develop a holistic understanding is central to EA practise, including its effectiveness (c.f. Geißler et al., 2019). However, this also requires deep knowledge by those who teach in the courses. Considering the limited research in EA carried out at the majority of the universities that teach EA, this could affect the potential for achieving best practice EA in Sweden. Furthermore, the two areas, research and complexity are closely related to the concept competent EIA expert required by EU. In many of the EU member states, the concept competent expert has been defined according to national standards (Marmefeldt, 2016). However, this has not been done in the case of Sweden. The analysis supports previous results (Balfors et al. 2018), that there is a need for arenas for learning. Both within university programmes and for practitioners.

Ethics is another theme (1.5) not covered by most courses. It might be partly covered by the principle 'Judgement' (3.3) but the ethical aspects require more than to deal with uncertainty, incomplete information, and competing values. In current Swedish legislation, there are no requirements of the EA practitioner being independent from the proponent. However, research has shown that e.g. consultants can be put under pressure to revise their conclusions of the EIA (Kågström 2016). Therefore, it is crucial that students are trained to uphold a high integrity in their profession. This can be done by a reflective practice throughout the education.

Potential for networked learning in EA teaching

The analysis of the syllabuses could be seen as a benchmark study against a standard reflecting the current state of teaching EA internationally. This poses a weakness to the study since the standard of the IAIA could be low compared to teaching in other fields. Therefore, a comparison with the design dimensions for NL experiences were carried out in order to relate the IAIA Principles to another categorisation, and potentially get insights for improvements. The comparison shows a clear correlation with the category Pedagogy of the IAIA Principles but also indirect correlation with Content and Skills. Based on this one could argue that the IAIA Principles could serve as a basis for analysis of EA courses. At the same time, both the design dimensions for NL experiences and the IAIA Principles are based on the current situation rather than where the standards of the two fields should to be in the future.

Networked learning focuses on cooperation and interactions between people, ideas and solutions (Networked Learning Editorial Collective, 2021). If applied on the field of EA teaching, this offers both an analytical framework and an area for inspiration when in developing EA teaching. The social dimension in NL is not visible in the analysed course syllabuses, but a few universities bring in practitioners as lecturers in their courses, mix students from different programmes, or engage in activities such as role play.

Another topic that could be further explored based on the NL design dimensions are the potential of Swedish and International EA teaching. Due to the common starting point of EA, the backbone of EA teaching is the same in all countries in the world and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger EA teaching communities. Here, NL offers a vast knowledge that is valuable for the EA community. Some areas of interest are design and models for lifelong learning, how to build technical support in large learning communities where participants bring their own data and much more.

In this analysis we have also identified two new themes that are not described in the IAIA Principles. These are 'Conflict management' and, 'A reflective practise including adaptive and agile management' meaning the capacity to re-evaluate the situation based on both new knowledge and information as well as for example arising conflicts. These two categories could only be found in three courses at two different universities. This means that we need

to adopt the pedagogical practise in order to enable these knowledge and skills. Teaching EA through reflective practice might be the way forward to further develop this area.

Conclusion

This paper has explored the current teaching of EA in Sweden. The analysis shows that there is a focus on practice rather than theory in the studied course syllabus. Furthermore, vital competences are lacking in current teaching, such as interdisciplinary systems thinking and research knowledge. The backbone of EA teaching is the same in all countries and there are good opportunities, with technology, to build international teaching networks. This would enable more knowledge sharing in larger teaching communities in the field of EA teaching. Therefore, network learning offers a potential for EA teaching, bridging the gap between theory and practice by focusing on reflective practice and strengthened national and international collaboration.

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SYMPOSIUM 3

Phenomenology and networked learning - a found chord

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Introduction

Phenomenology has captured the imagination of researchers since Edmund Husserl (1859-1938) began to use the term. Examples of phenomenology within the networked learning conference proceedings are notable yet few, as examined by Healey-Benson (2020) and Johnson (2020) in the 12th Networked Learning Conference, and who then went on to form https://hanfod.NL . The goal to 'engage the networked learning community in discussing the suitability of choosing phenomenology as a research methodology' (Oberg and Bell 2012, p209) had been demonstrated by Dohn (2006) and continued by Adams (2014).

If a broader interpretation of 'the phenomenological' were taken, many more authors could be listed, who have borrowed ideas from phenomenology or adopted approaches which have done that. For example, phenomenography (e.g. Cutajar and Zenios, 2012), that maps qualitatively different ways that phenomena are experienced, appears regularly at the conference. However, Marton (1981) distinguished phenomenography from phenomenology, e.g. taking first or second-order perspectives. We also recognise that some scholars may not acknowledge our own papers as even 'phenomenolog*ical*'. For them, phenomenology may require circumscription by philosophical methods, the preserve of mainstream philosophy conferences, even as such conferences are *broadening* their audience, e.g. the British Society for Phenomenology. Our approach is more inclusive, consistent with the conference's values, seeking to enrich and diversify research in networked learning while upholding its scholarly values and commitments. The symposium therefore contains, expands and explains philosophy, and features work with more applied aims, which draw inspiration from phenomenology and demonstrate harmony with both its essence and power to strengthen networked learning research in many ways and across diverse themes. For example, Adams, Groten and Yin confront issues within informal networked learning in an age-group rarely treated at the conference: pre-schoolers' development considering their exposure to artificial intelligence-enabled technologies.

A unifying approach to phenomenological literature shared by the symposium papers is the way that phenomenological philosophers have served as 'insight cultivators', whether in the figure of van Manen (2016), or one of phenomenology's canonical writers (e.g. Husserl, Heidegger, Sartre, Gadamer, Merleau-Ponty, Ricoeur, Stiegler). We challenge the Networked Learning Conference to recognise and engage with phenomenology as 'wonder in the face of the world' (Fink in Merleau-Ponty, 2012). We further urge delegates' attention to phenomenology's alignment with the Freirean and Networked Learning concerns for how we *think about and face the world*, regenerating research and practice. With this in mind, the symposium's final segment reserves a place for communal elaborations on aspects of the contributors' personal discoveries, taking a cue from van Manen in Lee's paper, of what it means to reflexively relive phenomenology and networked learning. This will present a

live opportunity to reflect on the phenomenological accord shared by the contributors, such as their *care* about experience in networked learning. All papers address the people/tech nexus, even if the technology, to draw upon Stiegler, is a timeless writing screen. This screen is at once used in research about networked learning, inscribed by the marks and traces that networked learning leaves behind *and* a warning of forgetfulness that can ensue if we rely on the record to remember for us.

The authors hope to demonstrate how phenomenology shares and reinforces the Networked Learning Conference's themes, and especially to understand and *trouble* our taken-for-granted selves vis-à-vis technology. Phenomenology's obsession with the *ordinary everyday* belies an acute ethical lens, so that scrutiny of what may be overlooked is instead subject to reflection that draws out lessons of the utmost urgency. Thus, we hope to assert phenomenology as a found, rather than 'lost chord', at the Networked Learning Conference, inspiring investigation into our future and what we mean by it.

- Kyungmee Lee: 'Evocative writing to research lived experiences of networked learning'
- Nina Bonderup Dohn: 'Investigating the background – taking a Merleau-Pontian phenomenological approach to Networked Learning'
- Felicity Healey-Benson, Mike Johnson, Catherine Adams, & Joni Turville: 'What is it like for a learner to participate in a Zoom Breakout Room session?'
- Jean du Toit & Gregory Swer: 'Networked learning in the time of pandemic: Intersubjectivity and alienation'
- Greta Goetz: 'Re-presencing the digital trace in networked learning design'
- Catherine Adams, Sean Groten & Yin Yin: 'Tomorrows networked posthumans: Reflections on Artificial Intelligence and the Digital Well-Being of Young Children'
- Final session: Joint reflective session exploring phenomenology and networked learning.

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Evocative writing and lived experience descriptions for networked learning research

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Abstract

The present paper introduces evocative writing, advocated by autoethnographies, as an effective research method to capture the subtleties of real-life networked learning experiences, enabling researchers to observe and make sense of both the beautiful and the ugly of the phenomenon. Evocative writing practice can liberate researchers from the established academic tradition that unnecessarily devalues their subjectivity and limits their creativity by imposing the problematic normality of research objectivity. Writing is a central research act that needs to be successfully performed throughout the entire research project—not only to present project outcomes but also to formulate research problems, collect data, and validate outcomes. Despite its aesthetic and communicative merits, however, evocative researchers as human beings cannot fully grasp the structural essence of the lived experiences of networked learning phenomena beyond their own frame of reference. Here, the author believes that lived experience descriptions and related methodological techniques devised by phenomenologists can provide evocative networked learning researchers with a possible breakthrough. Based on the author's own experiences, the author will demonstrate the effective use of evocative writing complemented by lived experience descriptions for networked learning research.

Keywords

Evocative writing, Lived experience descriptions, autoethnography, phenomenology, academic writing

Introduction

This paper discusses evocative writing and lived experience descriptions as effective methods for qualitative networked learning research projects that emphasise the value of thick descriptions of human (and non-human) interactions as a research outcome (Networked Learning Editorial Collective (NLEC) et al., 2021).

Academic writing is often called 'scientific' writing, following somewhat fixed formats, structures, and rules to maintain an adequate level of objectivity in it. Such pursuit of objectivity in academic writing is also sought by researchers whose aim is to develop deep(-er) understandings of a particular social phenomenon involving human-to-human interactions mediated by complex social, cultural, and technological factors. Researchers—even those who adopt qualitative research approaches that acknowledge the subjectivity of knowledge, the complexity of social phenomena, and the reflexivity of researchers—find it uncomfortable to explicitly present personal emotions and opinions (or 'I'-words) in their research reports. Within that long-established academic tradition which tends to dismiss researchers' presence as the first person in their writing, qualitative researchers are often expected to do a 'code-switch' between performing subjective reflexivity in researching and ensuring objective scientificity in writing. Despite a few exceptions (see Mann, 2005; Lee, 2021), most networked learning researchers have remained the third person in their writing practice.

The purpose of social research is multifaceted. However, the present article follows van Manen's (2016) well-articulated aim of phenomenological work:

> to transform lived experiences into a textual expression of its essence—in such a way that the effect of the text is at once a reflexive re-living and a reflective appropriation of something meaningful: a notion by which a reader is powerfully animated in his or her own lived experiences. (p. 36)

Ellis and Bochner's (2006) insight about the evocative purpose of autoethnographic work that differentiates it from other qualitative or ethnographic studies can also be helpful for readers:

> [to show] struggle, passion, embodied life, and the collaborative creation of sense-making in situations in which people have to cope with dire circumstances and loss of meaning. Autoethnography wants the reader to care, to feel, to empathize, and to do something, to act. It needs the researcher to be vulnerable and intimate. Intimacy is a way of being, a mode of caring, and it shouldn't be used as a vehicle to produce distanced theorizing. (p. 433)

Both descriptions stress the reflective, relational, and responsive nature of academic writing (and reading), through which researchers and readers share and co-construct deeper insights into the focused social phenomenon that may lead to meaningful changes in their lives. Thus, phenomenological and autoethnographic writings do not follow the objectivity of academic dogma but instead embrace the subjectivity of researchers (and the authenticity of their experiences).

Adams and Holman Jones (2018), building upon Goulish's (2000) notion of the work of art, argue that research is work and, at the same time, an art: "the 'work' of [social] research is the work of life—the work of writing the events of our human experiences as they overflow their frames from the inside out" (p. 142). Here, a work refers to an event "made through human action and experiences" (p. 141), and thus, research is an event of writing made through the researcher's (and research participants') actions and experiences. No one would disagree that writing is an essential part of research practice, especially in qualitative projects where researchers mainly deal with 'text' both as data and outcome. Such heavy emphasis on writing makes each qualitative research project naturally an art. Researchers are already inside their work of research as authors are already inside their work of writing, and artists (or all aspects of their existence such as their histories, cultures, circumstances, and emotions) are an integral part of their work of art. When we appreciate a piece of art, we often start by understanding the artist and their genuine motive for the work. We can do the same when reading a piece of qualitative and evocative research.

This set of statements may appear irrelevant and out of context to some readers and researchers, particularly given the incompatible genre-deterministic differences between academic writing and artistic writing (i.e., journal articles versus novels). However, the relevance of these statements to educational researchers and networked learning researchers is vital from the point of the present author, who will be called I, hereafter. I believe that researching a phenomenon of networked learning is a work of writing, which can and should be aesthetic processes and artistic practices. As I argue somewhere else, networked learning as a social phenomenon is not only idealised and distanced theory but messy, often ugly, and embodied reality. The lived experiences of networked learning involve the dynamics of struggle in ordinary educators' and learners' daily practice (NLEC et al., 2021). Thus, researching the lived experiences of networked learning needs to embrace and capture the messiness and concreteness, which is also well-aligned with the aforementioned purpose of phenomenological and autoethnographic research.

Rather than opening up a fundamental debate around a paradigm war in social research or defending a specific methodological tradition (see Bryman, 2008), I want to focus on practical values of particular writing approaches that can help research the lived experiences of networked learning. Two approaches introduced in the article are: 'evocative writing' drawn from autoethnographic tradition (Ellis, 2004) and 'lived experience descriptions' from phenomenological tradition (Adams & van Manen, 2017). I have found the artful writing method integrating the two approaches particularly useful when I engage with the 'work' of research and academic writing, which is an admittedly intimidating and frequently daunting task. When it comes to qualitative academic writing, there has been a lack of practical 'how to' advice. There is a notion of 'thick descriptions', as opposed to thin descriptions (Geertz, 1973; Lincoln & Guba, 1985), which has been the most well-known approach to qualitative research writing. However, as Denzin (1989) argued decades ago, there are significant variations in understanding and doing thick descriptions among qualitative researchers. While a large number of qualitative researchers attempt to provide thick descriptions in their academic publications, there tends to be a lack of workable definitions and practical methods to do so (Ponterotto, 2006).

As a doctoral educator teaching qualitative research methods in an online PhD programme and supervising a range of different qualitative research projects, I am frequently asked to advise them on how thick is thick enough for their theses or other genres of academic publications. Especially, doctoral students employing particular research methodologies (i.e., phenomenology or narrative inquiry) tend to find grasping the notion of thick descriptions challenging and enacting it in their real-life writing even more challenging. I often find students haunted by the

pressure to give more details, which can be endless and aimless, while being frustrated about the strict word limits of theses and journal submissions. While no one knows how thick is thick enough for a good thesis, I believe the loaded notion of thickness can be misleading. Coupled with the core purpose of research to make readers powerfully animated and ultimately act, I ask students to think about the aim of their writing—a central work of research that needs to be conducted throughout the entire process of research. The question is, therefore, 'why do you write?'.

This question further helps students think and break an invented and fabricated sense of division between academic and artistic writing. That is, if students decide to write to enable readers "to care, to feel, to empathize, and to do something, to act" (Ellis & Bochner, 2006, p. 433), the nature of their academic writing will become naturally artistic and inevitably personal. Just like the artists belong to their work of art—doctoral researchers will belong to their work of research (and writing). Here, the boundaries of academic and artistic writing will be collapsed and blurred. In the following section, I will first explain the two writing approaches, 'evocative writing' in autoethnography and 'lived experience descriptions' in phenomenology in turn. I will then discuss how the two approaches can be used in a single qualitative research project, complementing each other. Evocative writing supplemented with lived experience descriptions will also produce thick descriptions. However, added details will be carefully selected, purposely constructed, and aesthetically presented. The final section will present a brief scenario of how artistic writing can guide networked learning research.

Autoethnography and evocative writing

Autoethnography is a form of qualitative research that foregrounds a researcher's personal experiences and emotions and investigates the researcher's sense-making process of these experiences and emotions (Chang 2008). Autoethnography has its origin in a critical effort to develop an alternative approach to realist ethnographic tradition where researchers tend to stand as objective observers outside a cultural phenomenon under observation, aiming to develop generalisable theoretical understandings of broader social phenomena. Autoethnographers, on the other hand, are full members of a particular cultural phenomenon of their interest, offering insider knowledge of the phenomenon by researching and writing their own lived experiences in the phenomenon (Adams et al., 2015). Many autoethnographers are particularly interested in increasing their (and others') critical awareness of the problematic (unequal and oppressive) nature of social relationships and cultural practices. They employ critical reflexivity as a tool to analyse the influence of their social identities and relationships on their sense-making processes and subsequently reveal and critique taken-for-granted cultural assumptions and norms. Thus, autoethnographers are critical, not only about the outside world but also about their insider knowledge.

Anderson (2006) points out that a growing number of analytic ethnographers and qualitative researchers have also employed self-study methods in their inquiry, such as autobiographic writings, self-observations, and self-narratives. Although they would not explicitly present and reveal the self in their substantive writings, their works share many aspects of autoethnography. Therefore, to Anderson (2006), autoethnography, despite its newness as a methodological term and practice, is not necessarily alienated from analytic ethnography that emerged from the realist ethnographic tradition. He further categorises a specific type of autoethnography that is distinguishable from analytic ethnography but aligned with the ethnographic tradition as analytic autoethnography and proposes five key features of analytic autoethnography: 1) complete member researcher status, 2) analytic reflexivity toward both society and the self, 3) narrative visibility of the researchers' self in their writing, 4) dialogue with informants beyond the self, and 5) commitment to theoretical analysis (p. 378). And, it is the last feature that raises incommensurable disagreements between analytic autoethnographers and other autoethnogrphers (often labelled as evocative autoethnographers).

In their response to Anderson (2006), Ellis and Bochner (2006) strongly indicate their intention to maintain the critical positionality to the realist ethnographic tradition by highlighting the ungeneralisability of autoethnographic outcomes and unknowability of subjective truth—no one, including the self, will ever fully know and make sense of human individuals' lived experiences of social phenomena. Therefore, to Ellis and Bochner (2006), autoethnography is a political endeavour (rather than a theoretical one), which critiques cultural practice and social structures and reveals a hidden mechanism to oppress a particular social group. Autoethnographers, through evocative writing, engage others with their critical and reflexive self-narratives not only cognitively or theoretically but emotionally and politically, aiming to enable "the reader to care, to feel, to empathize, and to do something, to act" (p. 433) and ultimately, change social and cultural practice. As discussed above, this is where artistic writing, with its communicative and evocative (and often provocative) power to touch and change readers' minds.

Phenomenology and lived experience descriptions

Phenomenology is an umbrella term referring to a theoretical and methodological perspective that investigates a social phenomenon through the direct experiences of individuals in that phenomenon, not based on existing knowledge and external truth. Phenomenologists approach their concerned phenomenon from the subjective position of research participants who are (were) 'there' in the phenomenon—who live (lived) the phenomenon directly and make (made) meanings out of their experiences consciously (Groenewald, 2004). However, the essence of the phenomenon (or the primal meanings of human existence and experiences) is not easily accessible to researchers, especially when they are not there. Researchers' biases and assumptions, constructed by living and making sense of other phenomena, can make their access to the informants' experiences and consciousness even more challenging. Therefore, phenomenologists have strived to address such inaccessibility by utilising methodological strategies such as the epoché (i.e., bracketing the phenomenon to block researchers' biases and assumptions) and reduction. Phenomenological research also gathers concrete details, focuses on subtleties of direct human experiences, and draws meanings out of the details (Adams & van Manen, 2017).

There are some differences among phenomenological traditions regarding their approaches to the essence (or essential structures) of human experiences and consciousness. For example, Husserl (1913) puts an exclusive emphasis on the first person's consciousness in terms of making meanings of one's experiences to the degree that he brackets the question of the existence of the natural world outside the first person's intentional consciousness. Heidegger (1962), on the other hand, argues that the essence of human existence is being-in-the-world and being-with-others; thus, the meaning of our lived experiences needs to be sought based on the 'thoughtfulness' to the relational existence. Merleau-Ponty (1945) further points out that our consciousness is embodied in the natural world; thus, it cannot be separated from our body and the world. Despite such differences in the scope of analysis, all phenomenologists agree with the social and cultural situatedness of human interactions and value the human consciousness as a source of interpretations of those actions (Cohen et al., 2017). All phenomenological research projects aim to understand how people experience a particular phenomenon and make sense of these experiences. Outwith philosophy, applied phenomenology primarily draws upon qualitative research methods.

A phenomenology of practice (Adams & van Manen, 2017) inquiry begins with collecting concrete and detailed accounts of the first person's experiences, writing lived experience descriptions (LEDs, hereafter). Phenomenologists write LEDs to capture "the living throughness of the pretheoretical and prereflective immediacy of experience (Adams & van Manen, 2017, p. 784). Although they use data collection methods such as interviews and observations that other qualitative researchers commonly employ, they focus on collecting raw data from research informants (i.e., detailed experiential descriptions of the concerned phenomenon) rather than refined or reflected interpretations of the phenomenon (i.e., thoughts, reflections, opinions, and emotions). A collection of diverse LEDs of a particular phenomenon serves as an important data source in phenomenological work, from which phenomenologists draw to reveal specific characteristics structuring the lived experiences of the phenomenon and their existential implications on meaning-making processes (Lee, 2020).

Evocative writing complemented by live experience descriptions

In this article, I hope to provide a useful tool for qualitative research writing, helping networked learning researchers blur (at least, more freely cross) the fixed boundaries between academic and personal writing and expand the limited scope of research writing. Writing is a central act in qualitative research projects that needs to be performed not only at the end of the research process to present and publish research findings but continuously throughout the entire research process. As discussed above, autoethnographers and phenomenologists both focus on developing a text format of lived experiences, primarily based on personal memories, whether researchers own or research informants'. Researchers and research informants also use personal artefacts (e.g., photographs, videos, diaries, letters and posts on social networking sites) and consult with neighbouring others in their lived moments to construct more complete and comprehensive (or less distorted) life stories (Adams & Holman Jones, 2018).

However, there is a clear difference in the focus of their life writing acts between autoethnographers and phenomenologists. While autoethnographers' raw data of written memories would include a range of statements of their thoughts, opinions, emotions, and inner speeches, phenomenologists who advocate the epoché aim to block those personal judgements and reflections (at least until the later stage of the project). For autoethnographers, who are often researchers and research participants simultaneously in their inquiry, their subjectivity (i.e., their bias and assumptions about the self and others) is not something they can willfully remove from their life writing or sense-making processes. Instead, they try to explicitly acknowledge and critically analyse the influences of their

subjectivity on their lived experiences, meaning-making processes and subsequently, research outcomes. In this sense, researchers' bias can be a central subject in autoethnographic work that may reveal problematic cultural norms and regulations underlying particular social practices and relationships. Therefore, autoethnographers' descriptive texts of their lived experiences tend to be emotional, reflective, and interpretative, making their data collection and analysis a simultaneous task.

Autoethnographers' evocative writing employs diverse writing genres (e.g., poems, scenarios, anecdotes, dialogues), and many autoethnographers find such artistic and creative writing more natural, comfortable, and enjoyable than conventional (and scientific) academic writing. Evocative writing can be used not only in autoethnographic studies but in other qualitative studies. Qualitative researchers, through evocative writing, can engage with their research more personally, emotionally and freely, and the outcome can be extremely insightful and powerful. Carter (2002) provides her first-person account of lived experiences of being in an abusive marriage relationship alongside the information derived from academic literature. The sharp contrast between her evocative writing and academic writing as juxtaposed in the article (her "voices" versus "academic discourse", Cater, 2002, p. 1199) effectively demonstrates the value of evocative writing. On the left-side column, academic discourses focus on providing definite and complete narratives about abusive relationships such as characteristics of victims and abusers, different categories of abuses, causes and effects of abuses, victims' (and abusers') behavioural responses and perceptions, and policies and devices to protect victims. On the other side column, however, her evocative writing provides more nuanced accounts of victims' lived experiences of repeated abuses and decision-making processes to leave the abusive relationships, revealing the complex and persisting nature of the experienced abuses and subsequent emotional and behavioural responses in the past and their continuing impacts on her present (and future) life.

Nevertheless, the freedom of evocative writing should not turn into self-indulgence such that authors scribble whatever comes into their minds and burble on their feelings, thoughts, and opinions without supporting evidence. Unlike novels, autoethnographies are the outcomes of researchers' careful analysis of their lived experiences, often collaboratively done with research participants. The written stories and reflections in autoethnographies (even plots and endings in novels) need to be sensible, understandable, and trustworthy to readers (particularly those in similar situations). As much as researchers are allowed to bring themselves in their writing, readers as active meaning-makers in autoethnographic dialogues are encouraged to use their reflexivity to read and assess autoethnographies. Thus, autoethnographers' self-indulgence can be severely criticised by readers (Campbell, 2018). Therefore, evocative researchers must maintain critical reflexivity not only to others but to themselves and their own writing. To do so, researchers can also support and supplement their evocative writing with LEDs.

Writing LEDs is that stage in the phenomenology of practice approach where conscious effort is made to focus on pre-reflective concrete details about lived experiences, mindful of if not completely removing their biases and assumptions that direct their research activities, including data collection, towards a pre-set and self-serving direction. LEDs can provide evidence and further explanation of specific emotions, opinions, and reflections of evocative writers, while counter-evidence (or absence of supporting evidence) and different explanations can also be found in LEDs. Writing LEDs is not aiming to pursue objectivity in academic writing and data collection, but to utilise researchers' critical reflexivity more explicitly in gathering a richer and more rounded data set. Although there can be many more (or even better) ways to utilise evocative writing and LEDs together in a single qualitative research project, in this article as a starting point, I will propose three different ways to use LEDs as a complementary research strategy to evocative writing, each for a research phase of i) problem identification, ii) data collection and iii) finding verification. The following section will present a brief scenario describing how the two research methods can be used complementarily at each of the three research phases—based on a real-life networked learning research project.

A Scenario of Evocative Networked Learning Research and Writing

This section is written based on my chapter, entitled *"Why don't I feel empowered? Autoethnography and inclusive critical pedagogy in online doctoral education"*, in Handbook of Digital Higher Education (Lee, in press). The chapter presents my autobiographic narratives of how I ended up teaching autoethnography in my research methods module in an online doctoral programme and how I made sense of my teaching approach as the inclusive enactment of critical pedagogy. Despite critical pedagogy's fundamental requirement for teachers to empower their students and create democratic learning cultures and equal power relationships in their classroom, I have found it challenging (or even impossible) to do so. Here is a brief excerpt from the chapter:

> Now, you walk into your classroom with the noble determination of liberating and humanizing your students, and you remind yourself that "it is the pedagogy of THE OPPRESSED". Thus, you need to empower your students by avoiding teacher-centred instruction and encouraging student-centred dialogues—you feel ready for it. But something starts getting a little off here. You look at your students. They are confidence-looking educational professionals pursuing a doctorate at one of the most highly-rated educational departments in the UK. Many of them are more experienced educators than yourself, and some are academics or teachers in [higher education] just like yourself. It is evident that they possess social and educational privileges that have allowed them to enter your classroom in the first place. They are not like illiterate, silenced Chilean peasants (or urban workers) in Freire (1970) who would build solidarity towards liberating themselves from a shared oppressor. [...]
>
> "Why am I so nervous?" You pause and think. You then realize that you are a coloured immigrant woman and early career academic. While your middle-class privileges have been left back in your home country, your non-native speaker status continues to threaten your pedagogical legitimacy. Does this matter? You know that you need to empower your students. However, do you have the power to empower them? You now feel puzzled even more. [...]
>
> Upon the realization that your students, at least on the surface, appear to be more privileged than you, enacting the empowerment principle becomes even more challenging. Your genuine feeling of disempowerment may further harm your self-perception and self-confidence. It is a human instinct that you want to hide your lack of authority (and subsequently, a lack of confidence) by striving to gain more respect from students by emphasizing your intellectual superiority or taking more authoritarian attitudes. However, such efforts alienate you even more from the empowerment principle in critical pedagogy. Without sorting your own "inner" struggles and dilemmas as a disempowered critical pedagogue, you have no room to live up to your pedagogical expectation, unfortunately. Any breakthrough?

My evocative writing in the chapter continues to reveal limitations of critical pedagogy' empowerment ideal in today's networked learning contexts with a growing diversity not only among students but tutors. I critically reflect on Ellsworth's (1989) critique of the empowerment principle, using my own lived experiences, and add a more nuanced account. I further discuss how embracing autoethnographic principles (such as vulnerability, emotional dialogues, and unknowability) helps me overcome my own "inner" struggles and foster a genuine sense of community among module participants. Based on this evocative networked learning research scenario, I will now explain how researchers can use evocative writing and LEDs at different phases of such research projects: i) Problem formulation, ii) data collection and iii) outcome validation.

Problem formulation

Like other social researchers, networked learning researchers start their projects by selecting a research topic of their interest. Evocative networked learning researchers are likely to choose to research their own dilemmas, struggles or negative emotions in particular social learning situations. For example, I decided to focus on understanding and unpacking inner struggles (i.e., a lack of confidence and a sense of disempowerment) that I had experienced as an online doctoral educator with multiple cultural markers of disadvantages (i.e., Asian, female, non-native speaker, etc.). Most of those personal dilemmas and inner struggles, albeit natural and straightforward on the surface, are results of complex dynamics influenced by multiple social, cultural and relational factors. I could have just assumed that I did not feel confident because I did not have enough teaching experience, expecting to feel better over time. I could have ignored the negative emotions and continued following networked learning principles and introducing student-centred learning activities to my doctoral students. However, instead, I started writing about those feelings and emotions and specific events and accidents that aroused such emotions, wondering what underlying issues and causes were and how I could address them (at least make me feel better and more confident)—which became the subject of my inquiry.

Once a (relatively broad) research topic is selected, researchers need to identify a more specific research problem that needs to be addressed through the project. Researchers can write a series of evocative anecdotes of their lived experiences on the selected research topic, through which they can effectively grasp the complexity of the research topic and further understand the gravity of the issue in their (and others') lives. Here, researchers can also write

LEDs or add more detailed and pre-reflective descriptions to their evocative anecdotes. While researchers' own emotions, opinions, and reflections can be of a great place for them to start brainstorming their "personally" meaningful research projects, it is also important to ensure that their research outcomes would be "socially" meaningful, helping others in similar situations and other researchers in the relevant fields of networked learning research. Thus, through writing LEDs, networked learning researchers may identify what they know (or remember) and what they do not know about the lived networked learning events—the gaps in their knowledge (and memories). This process needs to involve reviewing relevant literature to check if previous researchers have already provided useful knowledge to fill such gaps in their knowledge. A specific research problem can now be formulated based on the identified gaps both in their personal understanding and academic literature (for more details, see Lee, 2019, 2021).

Data gathering

Researchers design their projects and set up specific plans and timeframes to collect data to address their research problems. In the project mentioned above, I produced a set of evocative anecdotes and LEDs that capture a range of critical lived moments of my networked learning experiences both as a PhD student many years ago, and as a tutor more recently. In order to write more comprehensive narratives and descriptions, researchers first collect their (or others') memories and perspectives of specific life events. Using qualitative data gathering methods such as interviews, observations, and journals, therefore, networked learning researchers can collect research participants' lived experiences of networked learning (both evocative and descriptive details of those experiences). In autoethnographic work, where the researcher is the research participant, researchers also talk to co-informants (neighbouring others in their memories) to collect those details that complement their own (incomplete and often distorted memories). Researchers write evocative texts that capture complex and authentic emotions, feelings, and thoughts based on the collected details and add LEDs to their evocative texts to increase the completeness of the data.

In evocative research projects, there is no clear-cut between data gathering and data analysis as researchers' work of writing the lived experiences naturally enables them to be analytical and reflective. I often write critical responses to previous research or imaginative dialogues (interviews) with educational and social theorists whose theorisation is particularly relevant to my inquiry. Such evocative writing helps me explore and record my lived experiences more meaningfully from multiple perspectives. For example, my chapter (Lee, in press) is effectively built upon my critical responses to Freire (1970), Ellsworth (1989), and Bali (2014), which were written at the data collection phase. Of course, this writing can be performed at the previous "problem formulation" phase when researchers reviewed relevant literature and identified gaps in the reviewed literature. I would call this "evocative literature review", which I have found useful to make reading academic literature more personal, meaningful, and entertaining.

Before "explicitly" moving into the data analysis phase, researchers can also check that they have collected enough details and subtleties of their pre-reflective experiences in their LEDs that are less influenced by (at least partially free from) their biases and assumptions. Researchers may read their evocative texts and LEDs side by side to see how they complement and contradict each other. They may have already noticed some emerging themes and core notions (answers to their research questions to a certain degree); however, it is important not to rush to the next steps that often involve coding or categorising exercises (depending on researchers' methodological approaches) but to focus on the completeness of the dataset. If there are contradictions between the two writings or apparent gaps in their LEDs that need to be filled, researchers can follow up with research participants.

Outcome validation

To maintain the trustworthiness of their projects, evocative researchers utilise different validation strategies (e.g., data triangulation, critical friends, and member-checking) to review their findings. Such effort to validate evocative research outcomes can be distinguished from what objectivist researchers would do to ensure the "reliability" of their data collection instruments (including inter-reliability of coders)or the "validity" of their (often statistical) results and interpretation. As much as researchers' subjectivity is important and appreciated in evocative research projects, the trustworthiness of their subjective findings and arguments is an essential aspect of those projects. Especially given that the purpose of evocative research writing (in opposition to objectivist research writing) is to "transform lived experiences into a textual expression of its essence", and so the experiences are re-living in readers' minds and creating meaningful changes in their thoughts and behaviours (van Manen, 2016, p. 36), researchers need to take the validation process seriously. That is, the outcome of evocative and artistic research work should be more than just creative and aesthetic artwork. When presented to their target audience, authors'

narratives (research findings) must be persuasive and understandable. Although readers may not necessarily agree with authors' entire arguments and interpretations, they should be able to "feel" and make sense of researchers' (research participants') lived experiences and emotional and behavioural reactions to the researched phenomena.

Doctoral students in my module often conduct their autoethnographic assignments on highly personal and political issues, such as institutional racism, gender discrimination, educational disadvantages, and workplace harassment. Many submit well-written evocative writings with aesthetic components, demonstrating a high level of emotional and cognitive engagement with their research problem and embracing a noticeable level of vulnerability and self-disclosure. Nevertheless, they frequently fail to fully articulate their findings or adequately support their arguments. Especially in their draft submissions, there is a wide range of problems, including taken-for-granted assumptions, unsupported claims, unarticulated statements, and hasty conclusions that threaten the quality (trustworthiness) of their final submissions. When reviewing these drafts, I tend to spend hours putting question marks on the margins and asking them to "provide evidence here", "explain this", "unpack this", "rethink about this", and "be more critical about this".

Here, phenomenological methods of the epoché and reduction can be useful. I specifically advise students to double-check if their findings are still persuasive when their own emotions (many appear to be angry, which is understandable considering their chosen topics), biases and assumptions are removed. Revisiting their LEDs is one of the effective ways to perform the validation process. I specifically request them to find evidence (or counter-evidence) of their arguments from LEDs. If they could not find adequate evidence there, they would need to rewrite their assignments. That is, evocative researchers can triangulate their dataset (comparing LEDs with and against their findings)—based on which they can more effectively and explicitly reflect on and write about the role of their own bias and assumptions on research outcomes. In conclusion, LEDs are useful research artefacts that mediate and facilitate the outcome validation processes in evocative research projects, helping evocative researchers maintain the firm boundaries between academic (and methodological) freedom and self-indulgence.

Closing remarks

Every freedom comes with a responsibility. I know it is a cliché. Nevertheless, for me, this is a core principle of doing evocative research: a work of art. Evocative academic writing is, to a certain extent, a political act to subvert an established academic tradition and create a new communication medium to achieve its own purpose. In evocative writing practices, authors are allowed and encouraged to bring themselves—all aspects of their existence, including their histories, cultures, circumstances, and emotions (even their biases and assumptions as a subject of critical reflection). However, while we can be free from the normality of scientific writing on our part, it does not automatically lift the normality of academic judgement on the other end (readers' end). Despite its aesthetic merits and communicative power, evocative writing enters the academic review process from a rather disadvantaged position by being abnormal. Evocative researchers are in a constant battle to gain the legitimacy of their methodological choices and approaches. Frequently, their works are not appreciated and regarded as an acceptable academic practice by reviewers, who do not share similar beliefs on the purpose of evocative writing.

Although reviewers appreciate its value to some degree, they may unconsciously employ a stricter (or more sceptical) attitude to evaluate evocative research outcomes. They may not tolerate minor issues in evocative writing, such as a small number of taken-for-granted assumptions, unsupported claims, or unarticulated statements. Therefore, it is even more important for evocative researchers to clearly explain their findings and effectively support their arguments (than for other researchers following the normality and formality of academic writing and publication). Evocative authors who fail to provide "adequate" details, explanations, and evidence in their manuscripts, can be called self-indulgent, and their voices can be neglected. Even though they present a "large" amount of information (e.g., detailed descriptions of lived events) and data (e.g., long interview excerpts) in their manuscript, it may not be the right information that needs to ensure the trustworthiness of their project. Nevertheless, when researchers are already inside their work of research (or authors are already inside their work of art), it is quite challenging for them to fully understand which details, explanations, and evidence are needed at which points of their work.

This is when evocative writing (or evocative researchers as human beings) faces its limits and LEDs can help. Writing, reviewing, and reflecting on LEDs at different phases of their research projects let evocative researchers put a conscious effort to distance themselves from their lived experiences and focus on pre-reflective details that they may have forgotten, ignored, or simply not noticed at the moment of living the phenomenon. Networked learning researchers, who take certain discourses (e.g., educational empowerment, democratic learning, learner

participation) for granted, may struggle to see critical details in the lived moments of networked learning that suggest otherwise. In any given moment of the social events (including networked learning events), numerous human experiences (emotions and actions) overflow their frames from the inside out (Adams & Holman Jones, 2018). Research is the work of writing those events, and it needs to capture and make sense of those experiences—not only those that fall into their frames of reference but those that fall outside. In the same vein, networked learning research writing needs to capture both the beautiful and the ugly of networked learning experiences to advance knowledge in the scholarly community and practice in everyday networked learning contexts.

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Investigating the background – taking a Merleau-Pontian phenomenological approach to Networked Learning

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Abstract

This paper is a theoretical paper on phenomenological methodology. My point of departure is Merleau-Ponty's concept of figure-background in perception and his view of the role which the body has in establishing figure-background in each specific situation. I argue that Merleau-Ponty's approach differs from other phenomenological approaches because of this focus: his highlighting of the background as essential for understanding what appears as figure to consciousness (the object of experience). His focus on the background has methodological implications for how to investigate a phenomenon (perform phenomenological analyses). A key Merleau-Pontian methodological strategy is to focus on breakdown situations, that is, situations where ordinary practical activity breaks down, because the breakdowns can provide indications about that which is taken for granted in the usual well-performed practical activity. I illustrate what Merleau-Pontian phenomenological analysis within Networked Learning could be with two examples. One is from synchronous online learning situations: the figure of *eye contact via a webcam*. The other one concerns contemporary renderings of the networked learners in the figure of *hybrid networked learning situations of students today*. For both examples, I tease out what relevant backgrounds are and how a focus on those backgrounds highlights other aspects in networked learning than the ones other phenomenological analyses focus on.

Keywords

Merleau-Ponty, phenomenology, networked learning, body, figure-background.

Introduction

The Stanford Encyclopedia of Philosophy (SEP) defines phenomenology as "the study of structures of consciousness as experienced from the first-person point of view." (Smith, 2018). It proceeds to highlight that "The central structure of an experience is its intentionality, its being directed toward something… An experience is directed toward an object by virtue of its content or meaning …together with appropriate enabling conditions." This characterization invites focusing on the conscious experience of the object, that is, on the dual aspects of a) what one might term 'the figure' of experience (the object, i.e., the phenomenon itself) and b) the 'what it is like' to direct one's intentionality towards the phenomenon. Importantly, the dual aspects are intertwined and co-constitutive, as the meaning of the phenomenon is the meaning-it-has-for-the-person-directing-their-intentionality-towards-it. This understanding of phenomenology is very much in line with the original articulation of the approach by Husserl (1928). It also accords well with the stances taken by some of the other papers in this symposium that analyse phenomena as they appear to us in conscious experience. The general method to allow phenomena to stand out was determined by Husserl as *epoche*. His point was that in order to allow the phenomenon to appear to intentionality as it is (as phenomenon), it is necessary to 'bracket' our preunderstandings of it. Husserl called the performance of bracketing *epoche* and the phenomenon as it is – that is, as experienced by first-person consciousness – the *noema*. Taking this approach within networked learning, one would focus on learners' conscious experience of synchronous or asynchronous collaborations with other learners. For instance, in synchronous online conversations, the phenomenon of *experienced eye contact via webcams* would be relevant to analyse (bracketing amongst others the knowledge that persons are not really looking at you when they appear to be because they then are looking directly into the webcam and thus are *not* able to see your picture on their screen, and conversely, when they *are* looking in your eyes, they appear not to be). Similarly, in asynchronous discussions, an interesting phenomenon for analysis would be the experience of *presence* (Fontaine & Chun, 2010) together with others (bracketing amongst others the knowledge that this presence is not one of actual simultaneousness, as one's communicating partners are logged off and will be doing something else, therefore not experiencing presence now, but at a later time where one will then oneself be logged off).

The entry in SEP notes that some phenomenologists will find the provided definition of phenomenology debatable and mention Heideggerians. This is reasonable, as the phenomenology of Heidegger concerns not the first-person experience but the fundamental ontology of being, that is, the way we are in the world. Heidegger argues that we are always already in an active engagement with our world in our everyday practical activities and that this provides a background understanding upon which phenomena-as-experienced stand out. Thus, his phenomenology is taken up with that which enables the first-person experience to be as it is, rather than the first-person experience itself. Or better: his interest in the first-person experience primarily concerns what this experience can show about the fundamentals of living (being-in-the-world) as that which conditions or determines the experience, ontologically speaking (as opposed to for instance psychologically speaking).

Merleau-Ponty picks up on the Heideggerian analyses, returning to the question of 'structures of consciousness' with the Heideggerian focus on what it is that enables conscious experience to be as it is. Thus, he focuses on how our concrete being-in-the-world allows the world to present itself to us as meaningful – in different ways, depending on the actual practical activities we engage in, but building on a basic meaningfulness founded in our bodily being. The new insights he brings to phenomenology include the role of the body in perception and the development of the figure-background structure of perception, building on this role. Perception is here to be taken in both its literal and its metaphorical senses. Other phenomenologists before Merleau-Ponty have discussed the figure-background structure of perception (e.g., Husserl targets this structure with his notion of the inner and outer horizons of a phenomenon, Husserl, 1980). They do not, however, have Merleau-Ponty's explicit focus on the body as the unperceived centre of our world – a centre, which is fundamental in establishing the figure-background structure.

Interestingly, the entry in SEP ends in the following way:
"Importantly, the content of a conscious experience typically carries a horizon of background meaning, meaning that is largely implicit rather than explicit in experience. But then a wide range of content carried by an experience would not have a consciously felt phenomenal character. So it may well be argued. Here is a line of phenomenological theory for another day." (Smith, 2018).

In this theoretical paper on phenomenological methodology, I shall argue that this last remark overlooks the significance of Merleau-Ponty's contributions as his phenomenological analysis of the figure-background structure – and the methodological implications it has – precisely allows him to target this "wide range of content … [without] a consciously felt phenomenal character". I present this argument in the first part of the paper. In the second part, I bring the Merleau-Pontian approach to Networked Learning, explicating how phenomenological analyses following his insights differ from those of other phenomenologists, including the other papers in this symposium. I shall look at two phenomena from networked learning and tease out what relevant backgrounds are and how a focus on those backgrounds highlights other aspects than the ones which other phenomenological analyses focus on. In a previous article, I discussed how the Gibsonian term affordances can be conceptualised on a Merleau-Pontian view (Dohn, 2009). The present paper builds on the points made in that article about the role of the body and perception's figure-background structure but broadens the argument beyond affordances to experience of the world more generally. Equally importantly, the present paper takes on the methodological discussion of how to do phenomenology within Networked Learning according to Merleau-Ponty; a discussion not elaborated on in the previous paper.

The role of the body in perception's figure-background structure

Merleau-Ponty follows Heidegger in emphasizing pre-reflective non-thematised practical activity as our primary way of being-in-the-world. Practical activity takes place in a world that is always already meaningful for us, before thematization, and as a precondition of thematising specific aspects as of this or that significance. Or better put: Practical activity *has* its world of meaningfulness, upon which specific aspects appear with the significance they have for us in our practical activity. Merleau-Ponty's decisive move beyond Heidegger is to articulate in full the significance of our bodily being for this pre-thematic meaningfulness. Obviously, but surprisingly often neglected, we undertake practical activity as bodily beings, not as perceiving, bodiless minds. Our bodily being enables, preconditions and constrains the movements possible – we perform movements that are 'within bodily reach', as one might say. This is to be understood spatially, where, importantly, bodily space does not coincide with physical space (e.g., there are points on one's back that are adjacent in physical space but require totally different bodily moves to reach with one's hand). It is also to be understood metaphorically, in terms of habituated action possibilities. Situations call upon us to move in certain ways, from the viewpoint that our location in a specific place provides. The body literally is the origo of the experienced world – in Merleau-Ponty's words "the

unperceived term in the centre of the world, towards which all objects turn their face" (Merleau-Ponty, 1962, p. 82). The primacy of practical activity is underscored by Merleau-Ponty in statements such as the following:

> "Our bodily experience of movement is not a particular case of knowledge; it provides us with a way of access to the world and the object, with a 'praktognosia', which has to be recognized as original and perhaps as primary. My body has its world, or understands its world, without having to make use of my 'symbolic' or 'objectifying function'" (Merleau-Ponty, 1962, p. 140).

Importantly, this experience of movement is not a thematised, reflective experience, instead we know our body and bodily movement through the activity we are undertaking:

> "[M]y body appears to me as an attitude directed towards a certain existing or possible task… [When smoking a pipe,] I know indubitably where my pipe is, and thereby I know where my hand and my body are… [My body] is polarised by its tasks… [has] *existence towards* them" (Merleau-Ponty, 1962, p. 100f)

This "existence towards" our tasks is what provides the figure-background to perception. What is in figure for the task stands out on the background of our understanding of the task and more generally of our understanding of the world. And this understanding, as Merleau-Ponty says in the first block quote, is not one of symbolic (i.e., representational and/or articulated), reflective awareness. Instead, it is an understanding incorporated in our body as 'praktognosia', that is as bodily ways of going about the world, as habituated agency. Bourdieu, who in this respect can be viewed as drawing sociological implications of Merleau-Ponty's epistemology (Ostrow, 1990), calls it our habitus (Bourdieu, 1977, 1990). With a simple example, when students enter a lecture hall ahead of a physical lecture, the figure of their task is finding a seat in the audience corresponding to the degree of proximity they want with the teacher (or, conversely perhaps, corresponding to the chance they want of hiding behind others). This figure stands out on the unthematized background of their practical knowledge of classroom layouts and roles for teachers and students respectively. It further stands out on their more general practical knowledge of the world of schooling with its organisation of learning practices, power asymmetries, social relationships, material resources for learning etc. In addition to practical knowledge of cultural practices, not specific to school, of for example sitting on seats inside rooms when dealing with other people. All this practical knowledge unites to highlight the audience seats as the ones to orient themselves towards. The lectern, contrariwise, not only does not stand out as figure for the task – it is an 'unthinkable' and 'unengageable' place for the students. At most, it will have the role of an obstacle to be passed on the way to the audience seats.

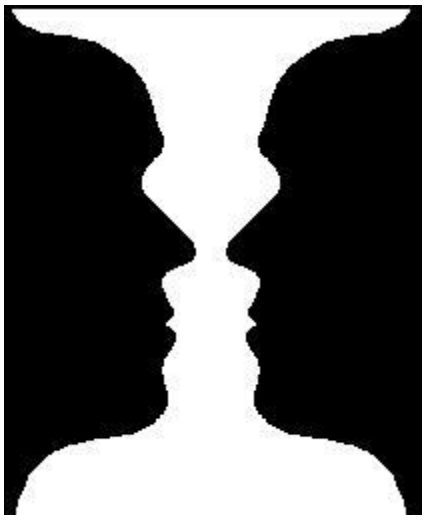

Figure 1. Rubin's Peter-Paul goblet. Source: Wikicommons, picture released into the public domain. https://commons.wikimedia.org/wiki/File:Facevase.JPG

Often the figure-background structure of perception is illustrated with gestalt-switch pictures such as Rubin's Peter-Paul goblet, Figure 1, which allows a gestalt switch between seeing two black faces and seeing a white vase. The Peter-Paul goblet is illustrative in showing how the background is as important in determining the figure as the figure itself – without the background there would be no figure. Just as for a person without the practical

knowledge of the world of schooling, of classroom layouts, sitting practices etc., the array of things in the lecture hall would not have the meaning of seats to be chosen for attending the lecture. Nor would the lecture hall be a lecture hall for that person.

The goblet is, however, misleading in the sense that it invites the belief that figure and background are interchangeable and that it will always be possible to switch focus from the figure to the background, that is, make the background the new figure. Yet, in general, this will not be possible – gestalt switch pictures are very special in this regard. They are noticeable, special and fun, precisely on the background of our extensive practical knowledge of dealing with pictures that are not like that.

Further, the goblet is misleading in the way that every picture is misleading: It invites regarding perception as a series of still pictures rather than dynamically unfolding as an integral part of agency in the world. This is in direct contradiction to Merleau-Ponty's view of perception as inherently bound up with movement and practical activity. Further, it holds the mistaken promise of inspection: you can scrutinise a still picture for as long as you want, potentially allowing full analysis of what the background is and how it contributes to the figure. This is in general not possible in the dynamic unfolding of practical activity where focus is on the figure of the task.

Instead, in the vast majority of cases, the figure will stand out from the background, with meaning provided by the background, through our engaged bodily "polarisation" towards it, without us being able to switch and foreground the background – and often without us being aware that there is a background. The row of seats in the lecture hall are the obvious figures, not the air between the seats. But this is not because the air is "nothing". It is because the seats are what we engage with as figures in our practical activities of sitting down, listening, talking, reading, solving problems, etc. The air is just the in-between – not even experienced as a background –that we traverse to engage with the figure. If, however, there was to be a hole in one of the seats, then this hole could potentially become a figure on the background of the seat – depending on the size of the hole, where it was placed, and how disruptive it was for our practical activity of sitting in the seat. It is thus not the case that air – as 'nothing' – cannot be a figure. What is figure and what background will depend, first, on the practical activity we are currently engaged in (to the degree that – anecdotally – one as a teacher can fail to notice that one is standing in 10 cm of water resulting from a leak, because one is fully taken up with the activity of teaching), and, second and more generally, on what matters to us as human, bodily beings with habituated action possibilities. The "polarisation towards our tasks" has this more general aspect of habituated action possibilities to it, too. This provides a structure of meaning to our surroundings, letting some aspects reside always in the background, whilst others can take on the role of figure depending on our current tasks.

Implications for phenomenological methodology

The points made in the preceding section were formulated primarily for perception. Still, as our primary way of being in the world according to Merleau-Ponty is practical activity, which incorporates a non-thematised, pre-reflective understanding of this world, the points are a valid characterization of our epistemological predicament in general. We meet the world as bodily beings that always already know this world, where the world is meaningfully structured by our "polarisation towards our tasks", and this polarisation lets situations appear with figures of meaning, on the background of our non-thematised, pre-reflective understanding.

This is where the methodological worry of SEP, mentioned in the introduction, comes in: Our consciousness is directed towards the figure of our tasks, and the background upon which the figure stands out stays unnoticed – in principle, because that is how it functions as background. Therefore, "a wide range of content carried by an experience" (as the SEP entry puts it) is not available for directed intentionality. That is, it is not available for the kind of phenomenological analysis that Husserl would have us perform. Performing *epoche* on the figure to get at the phenomenon itself (as it is for us) will, to the extent it is possible at all, only make matters worse, as this will bracket off the preunderstanding upon which the figure becomes what it is. However, since the background is non-thematised, in actual fact it will not be possible to consciously bracket it off. Aspects of it might perhaps be bracketed off, though, as part of bracketing off some presuppositions of which we *are* aware. Be that as it may, what is important to note is that directing intentionality at the figure and analysing the phenomenal experience of it does not give us access to the full phenomenon. In this sense, concentrating on the figure of experience and performing *epoche* is deceptive. This point goes wider than Husserl's recognition that every phenomenon carries an outer horizon of meaning. Firstly, because Husserl understood the relationship here as a continuum between what is at the margin and what at the centre of consciousness, rather than a figure-background structure. And

second, because Husserl believed it to be possible through contemplation on that which presents itself to directed intentionality (the figure) to perform a logical reconstruction to the full phenomenon.

Merleau-Ponty, on the other hand, acknowledged the basic limitations of directing intentionality to the figure and logically reconstructing – rather than experiencing – the full phenomenon. Put differently, he recognised the limitations to thematising the non-thematised practical activity, because thematization fundamentally changes the phenomenon under investigation. Simple examples are riding a bike or touch typing: When performing them well, you do not focus on the movements themselves. Instead, analogously to Merleau-Ponty's remark about knowing where his arm is through smoking, you know your movements through focusing, for the bike, on where you are going and what is ahead of you, and for the typing, on the claims you are trying to formulate. If you thematise keeping your balance or the placement of the letters, respectively, whilst performing the activities, this will affect the performance to the degree that you may lose balance/need to look for the letters on the keyboard. Thematising after well-performed activity – as in Husserl's logical reconstruction – is speculative at best, as it will postulate 'marginally felt phenomenal aspects' or 'aspects of marginal consciousness' for which there will typically be no independent evidence. Instead, arguments will build on for instance the phenomenal experience one has when one does thematise (with detrimental effects) keeping one's balance/finding the letters. This experience will then be conjoined with the claim that because the experience is there when you thematise activity, it has to be there in the margins in non-thematised activity. Paraphrasing Dreyfus similar argument regarding skills as allegedly necessarily rule-governed, this corresponds to saying that because you have learned to ride the bicycle using training wheels, once you can ride it without the training wheels, they must nonetheless still be there, now only in invisible form (Dreyfus, 1979, p. xiii).

In a nutshell, the methodological problem is that non-thematised practical activity supplies the background understanding upon which thematised figures stand out, and that attempts at thematising the practical activity fundamentally changes the phenomenon by making it a figure. Merleau-Ponty's methodological solution to this problem is remarkable: He attended to what one following Dreyfus may call situations of 'breakdown' (Dreyfus & Spinosa, 1999), that is, situations where practical activity breaks down. The reason for attending to breakdown situations is that they can provide indications about that which is taken for granted in the usual well-performed practical activity. Merleau-Ponty's focus was the phenomenological analysis of bodily agency in the world. Therefore, relevant breakdown situations for him were ones where persons had lost their former action possibilities and/or were without the perceptual opportunities of most humans. He found such relevant breakdown situations within experimental psychology, and, in particular, within the investigation of the experience of living with amputated limbs and with certain brain disorders. Both formed a significant part of his argument for what he termed the "body schema", that is, the way we as bodily beings "have our world", and attune to it in well-performed practical activity. His analyses showed how our body schema allows us to take the layout and surroundings into account in our actions – immediately, non-reflectively and non-thematised. Others have followed up on these investigations, adding further details to the role of the body in understanding the world (Gallagher, 2005; Johnson, 1987; Lakoff & Johnson, 1999). In the next section, I shall provide two examples of what breakdown situations in Networked Learning show about ordinary practical activities of teaching and learning – online and in face-to-face situations.

Investigating backgrounds of figures within Networked Learning

In this section, I shall illustrate how to perform Merleau-Pontian Networked Learning analyses and how they differ from other forms of phenomenological investigations.

The figure of eye contact via a webcam

My first example is one mentioned in the introduction: the figure of *eye contact via webcam*. I should emphasise that I have chosen this example because it allows me to highlight the contrasts between Merleau-Pontian and other phenomenological analyses, as regards methodology and as regards analysis results. My choice thus does not reflect a premise that Networked Learning will always take place synchronously, with webcams. Nor does it stipulate that all online learning situations with webcams will be Networked Learning situations. It does take for granted, though, that some Networked Learning will take place with webcams – and will include synchronous lectures and discussions – and that it therefore makes sense to investigate the experience of eye contact (or not) phenomenologically.

A Husserlian inspired phenomenological analysis of this figure of *eye contact via webcam* would focus on the eye contact phenomenon as *noema*, in the form of *experienced eye contact* (bracketing the known fact that actually

there is no eye contact) or, alternatively, in the form of *experienced lack of eye contact* (cf. Healey-Benson et al., 2022, this symposium). A Merleau-Pontian phenomenological analysis instead focuses on the *lack of eye contact as a breakdown situation* – or rather, a set of breakdown situations – that jointly point to important taken-for-granted aspects of ordinary practical teaching and learning activities. One type of breakdown situation is the one where the web-cam picture of your communication partner is activated but is not conveying the person as engaged in communicating with you, although they are, and you know them to be. This is the case for instance when that person is consistently turned away from the webcam to look at another screen (where your webcam picture may be placed so that they are in fact looking at you), or when the laptop with webcam is tilted in a way so that you can only see the upper part of the person's head. Even after having experienced it innumerable times before, an immediate response in the latter case is to try to adjust your own laptop to get the person into full view. In the former case, the communication partner appears as intentionally distancing themselves and therefore as somewhat rude and unengaged. Another type of breakdown situation is the one where you consciously take the knowledge of the first type of breakdown situations into account and deliberately work the technological set-up to make it appear to your communication partner that you are looking at them when you are in fact looking at something else. One (mostly benign) instance of this is, when working with multiple screens, to choose the screen with the webcam as presentation screen so that it will appear to your students that you are talking directly to them, though in fact you do not see them at all. Another (not so benign) instance is when you do other things onscreen whilst someone else is talking but purposefully hide this by placing the window you are working on close to the webcam so it will look as if you are looking at the person talking. A third type of breakdown situation is the one where most or all students have their webcams turned off, so you see a black square for each student rather than the communication partners themselves – and do not even know whether they are there at all. This affords an experience of talking into a materially felt emptiness which is very different to the 'absence-of-seeing-the-students' resulting from the second type of breakdown situation. The two situations differ because in the former, the black squares are not just an absence of the student but rather a visible non-presence. This non-presence appears as a purposeful act of distancing on the part of the students (whatever their actual reasons for shutting off the webcam are).

These breakdown situations jointly hint at – or even make visible in their failing – our ordinary, physically co-located practices of dynamically and reciprocally attuning ourselves bodily to our communication partner in teaching and learning. This reciprocal attuning works as the background upon which the figure of communication – its content, the communication partners' respective emotions, their sentiments towards each other etc. – stands out. Thus, the response of adjusting one's own laptop screen to get the other person into full view is a specific (failing) instance of the everyday background practice of adjusting one's own body posture to see and hear the communication partner better. Now, a reasonable question here is whether the ordinary practice of bodily adjusting is really an inherent part of the phenomenon of communication or whether it is not just a physical making communication possible. That is, whether it is actually just a necessary causal prerequisite of communication, but not integral to determining the figure of communication (and thus not background in the Merleau-Pontian sense, cf. above). One of the other breakdown cases provides clear indication of the answer to this question: The appearance of distancing afforded by one's communication partner's turned-away body and the resulting appearance of rudeness and lack of engagement are significant in determining the figure of communication. In the webcam situation it is unrightly so – that is why it is a breakdown situation. But the case signifies that in ordinary practical activities of co-located communication, bodily posture and the way one adjusts it in the flow of communication are indeed an inherent part of the phenomenon of communication, as the background co-determining the figure. In light of these considerations, the workarounds of the second type of breakdown situation can be seen as conscious attempts to restore for one's communication partner the possibility of engaging in the figure of communication on a background of unthematized reciprocal bodily attunement (though falsely so).

The phenomenon of visible non-presence in the breakdown situation of students with turned-off webcams is illuminating, in particular if compared to the ordinary practical activity of talking to others on a traditional phone (i.e., without the possibility of seeing each other). In the latter case, communication may be impeded somewhat by the lack of gestures and facial expressions, but usually one does not have the experience of 'materially felt emptiness' and of deliberate distancing on the part of one's communication partners. In part, the difference may be ascribed to the fact that in most phone calls, one has only one communication partner and the conversation will follow turn-taking patterns (Sacks et al., 1974) with continuous phatic reconfirmations (Jakobson, 1960) of the connection established between the partners. Whereas in teaching online, there are usually many students, so communication does not follow conversation turn-taking patterns and, in particular, continuous auditory phatic reconfirmation is not provided by the students. It would be disruptive to the teacher (or student) talking if it were. This explanation does not suffice on its own, but it does help in pinpointing important background practices shown up by the breakdown situation. Firstly, phatic reconfirmation and turn-taking could to some extent be provided by

students if their webcam was on, in the form of nods, facial expressions, note-taking etc. This would correspond to what happens in physically co-located teaching and learning activities – which again highlights the significance in such activities of teachers' and students' dynamic bodily attuning to each other as background for the figure of communication. Secondly, and more importantly, a crucial difference between the telephone and the shut-off webcam cases is that the latter holds the potential for seeing each other whereas the former does not. This potential, and the students' intentional disregard of it, seemingly thrusts itself upon you as teacher in the form of the black squares, affording the bodily feeling of talking into a sensuous emptiness. On the one hand, this feeling can be interpreted as the consequence of the body being the "unperceived term in the centre of the world, towards which all objects turn their face" (cf. above): As the face turned upon you here is the negated one of visible non-presence (even: of a set of no-faces), the experience is not nothingness but sensuous, dense emptiness (akin to the feeling one has when walking into a pitch-black room with eyes wide open). On the other hand, this breakdown case serves to indicate that in ordinary practical activities, we take it for granted that potentialities of visibility to each other will in fact be actualized by us as communication partners. The breakdown case further indicates that, when such potentialities are not present, we make use of substituting means of communicating presence such as the continuous phatic reconfirmations provided in telephone conversations.

Of course, sometimes considerations of for example bandwidth or stability of connection may lead us to decide to turn off our webcams. However, these are instances where the potentialities of visibility show up as not actually present, though we thought they were. In other words, in such situations the lack of potentiality for visibility appears as figure in the breakdown situation of the online connection's faltering. This contrasts with the telephone call where the lack of potentiality for visibility is a background aspect, leading communication partners to figure their conversation with extensive use of phatic turn-taking.

These considerations allow me to add some further detail to my discussion of webcam use in Dohn (2009). There, I focused on the affordances of a webcam and on our background bodily attuning to these affordances. In particular, I pointed out how the introduction of a webcam changed the figure of the IT-based communication to one in which participants 'can-be-seen', and that participants would bodily attune to this situation and accommodate their behaviour accordingly (e.g., not get up to fetch coffee without apologizing in advance). I noted that participants would often not be representationally aware of their bodily attunement, as they would often claim not to take heed of the webcam in their communication with one another – and that their eye movements supported their claim. This latter statement stands in apparent contradiction to the significance which I have accorded to the webcam picture here, both in terms of the importance of (apparent) eye contact and as regards having the webcam turned on.

There are a couple of things to note about this apparent contradiction. Firstly, I have concentrated here on situations where one *is* focused on the webcam – either because there is no other shared focus (in the form of e.g., a shared document one is working on and/or a shared presentation screen) or because one as teacher is trying to facilitate communication with one's students. In my 2009 article, I do not explicitly mention which kinds of communication situations participants refer to for their experiences. Remedying that, I can now say that they were referring to situations where focus was indeed on a shared screen or working document (potentially accessed by each participant individually), with the webcam as a small extra window on the screen. They were not referring to for example a Skype videoconference with their teacher or group members (where they *would* be looking at the other participants in the videoconference). Secondly, our ordinary practical activities have changed quite a bit since pre-2009. The differences in experiences between participants then and the breakdown situations considered here may well be due in part to different unthematized expectations stemming from these changed background activities. Thus, one might speculate that the background practical activities upon which online synchronous communication stood out in the years before 2009 were still to some extent traditional telephone calls (without picture), and that this would have influenced participants' engagement in situations *with* webcams, leading them to forget to look at it, even if they still attuned to its affordances of being-seen. Third, technological possibilities were not as advanced – bandwidth connections were not nearly as good then, so the turning off of the webcam would often have been a necessity (with the corresponding lack of potentiality of visibility appearing, as discussed above, as figure in the breakdown situation of the online connection's faltering). Likewise, the practice of working with several screens was not very widespread then. Because of the fewer technological possibilities at the time, some of the breakdown situations described here did not occur very often if at all.

The figure of *hybrid networked learning situations of students today*

A recurrent figure in descriptions of present-day networked learners is their negotiation of complex, hybrid spaces, where they conjoin, mix, and remediate physical and digital learning resources. Descriptions range from the optimistic (hyped) characterizations of "networked individualism", put forward by for instance Rainie and Wellman (2014), to nuanced accounts of the socio-material entanglement of learning practices today, which emphasise students' continuous work of reciprocally adapting learning to fit the situation at hand and adapting the situation at hand to fit learning (Gourlay & Oliver, 2014; Oliver & Gourlay, 2016). A few examples will suffice to illustrate the figure (as well as differences in articulations of it):

> "The hallmark of networked individualism is that people function more as connected individuals and less as embedded group members. For example, household members now act at times more like individuals in networks and less like members of a family. Their homes are no longer their castles but bases for networking with the outside world, with each family member keeping a separate personal computer, address book, calendar, and mobile phone." (Rainie & Wellman, 2014, p. 12)

> "Among other things, people now expect to find information on almost every subject quickly. They expect that they are more findable and reachable at many more times and places than in the past – and they assume others are equally as likely to be accessible. They have reallocated the way they use their time and attention. They pack more information and communication exchanges into their days and they are interruptible in their activities more often. Their sense of place, distance, and presence with others is transformed as they participate in more encounters that feature "absent presence" or "present absence." Their sense of self transforms from a hard unitary shell to a reconfigurable amoeba with situationally changing pseudopods… This is an operating system that confers social and economic advantages on those who behave effectively as networked individuals, blending significant personal encounters and new media as they solve problems and build social support." (Rainie & Wellman, 2014, p. 256)

> "The pervasiveness of internet access (in some parts of the world) and the dramatic increase in ownership of mobile technologies (laptops, tablets and smartphones) are changing the places of where and how networked learning is happening. From virtual learning environments being mainly used by 'distance education' to becoming a standard component for all higher education students. From ICT and learning being an esoteric activity in labs to becoming a pervasive part of campus and lecture hall activities (whether consciously or not on behalf of the teacher). From working primarily from home to people being on the move and engaging in online activities while being on the train or in cafes, and students alternating between distributed work and meeting on campus. Mobile field activities, informal learning communities are other examples." (Ryberg & Sinclair, 2016, p. 13f)

> "Rather than being bound within educational institutions, studying spills out across many public and private spaces, moored as part of a consistent practice of education by the consistent uses of print and digital technologies. Within this, institutionally provided spaces remain important, not least because they allow connections to other people, times, and places that carry connotations of studiousness and academic-ness. Such spaces cannot "bind", because of the way learners, technologies, and practices move into, through, and out of them…" (Oliver & Gourlay, 2016, p. 84f)

> "What we want to highlight with this category ["orchestrations of multiple technologies"] is the fluid boundaries between the "digital" and "physical"—a fluidity that (increasingly) seems to render the very distinction superfluous. The digital spaces are always present in the physical spaces, and we see from the data how various technologies are transposed from digital representations, to a blackboard and post-its and then re-digitised… Thus, the digital and physical are heavily interwoven and difficult to separate. …[S]tudents' nomadic collaborative learning is a complex dance that involves not only which technologies to use, but also in what spaces particular entanglements of technologies and activities are meaningful—often dependent on the processual aspects (are they in an early explorative phase or in a production phase where work can be distributed) …We are only beginning to understand … the extent they [student practices] involve mixtures of digital and physical spaces, activities, social cohesion and technologies." (Ryberg et al., 2018)

Despite divergences in perspective, these different quotes combine to articulate a figure of contemporary (pre-pandemic) Networked Learning which contrasts with early Networked Learning literature that mainly focused on online courses and participants' experience hereof (cf. reviews on Networked Learning in Carvalho & Goodyear, 2014; McConnell et al., 2012). In the quotes above Networked Learning appears as a thematized accomplishment of the learner who intentionally manages, utilizes, and negotiates hybrid complexes of physical and digital resources and environments in correspondence with what is needed for the task at hand. The last quote formulates this accomplishment as a "dance", inherently involving collaboration with other learners. In contrast, the other quotes more or less explicitly thematize it as the individual student's choosing of where, when, how, with whom and with what to connect. That it takes work and effort to make the hybrid situations of networked learning function is clear in most of the quotes. Still, this work appears to be thematized, situated in the (hybrid) here and now, centring on the conscious objective of the networked learner.

The Covid-19 lockdowns in 2020 in effect constituted a massive breakdown situation for ordinary learning activities, both hybrid and non-hybrid. In consequence, they allow an investigation of the background, taken-for-granted aspects, upon which this figure of *hybrid networked learning situations of students today* stands out. The initial experiences of students, teachers and researchers have already been quite extensively investigated (e.g., Special Section of British Journal of Educational Technology, 2021; Special Issue of Journal of Computer Assisted Learning, 2021, Fayed & Cummings, 2021). Common traits are experiences of loneliness; feeling distanced to others; problems in accessing relevant learning materials; closing off of field studies; deterioration of academic engagement. Complementarily, there are reports of students finding more focused time for study; with fewer disturbances and less time wasted on travel; of study situations being less stressful for students who find the ordinary close social encounters in education challenging; and of students finding that family members and home resources can support their learning much better than they had previously realized. Broadening the scope beyond the purely academic, students (like so many of us forced to work from home) have found it very difficult, oftentimes disruptive, to manage to find space, time, bandwidth, concentration, silence, motivation, and family acceptance for focused study in the intermingling of personal and professional life that lockdowns meant. Studies had to be undertaken in the midst of caretaking of youngsters and pets, homeschooling, consideration towards family members' similar needs for bandwidth, silence, space etc. – with interruptions of meetings and classes by children and pets becoming more the rule than the exception. Emotionally, many have experienced inadequacy, failure, guilt, and despair on all counts and towards children, partners, education, and part time jobs alike. On the other hand, there are many examples of creative transformations of what used to be physically co-located activities into online formats, ranging from Zoom-mediated preparation and eating of the same meal in different physical locations, over geographically distributed playing of physical board games and choir singing, to innovating student shows by reinventing them in online formats.

Collectively, these experiences combine to problematize some of the articulated aspects of the figure of *hybrid networked learning situations of students today*. More generally, they show that this figure stands out on the background of an extensively structured everyday, not only as regards engaging with the task at hand itself (which is clear in the studies reported by Oliver & Gourlay and by Ryberg et al.), but more significantly as regards enabling such engagement at all. Thus, the lockdown arguably forced us to try to live as Rainie and Wellman claim we do – with household members each having their individualised base for their networked life, professional and private, with persons outside of the household. The repeated breakdowns of interference by family members' legitimate claims on our attention and time, as well as the continuous negotiations of resources enabling *their* networked life, show how much work goes into enabling even for a short time the figure that Rainie and Wellman delineate. It also shows how vulnerable the figure is and that it stands out also in non-lockdown times on a background of a highly intermingled and interactional family life – a background that Rainie and Wellman completely neglect. Further, the breakdown situations of the lockdown show how much the hybrid networked learning situations (as described for example by Oliver & Gourlay and by Ryberg et al.) depend on a background of being able to flexibly move across geographical locations and engage with new people and learning resources in settings not planned for. And they show how crucially these learning situations depend on continually working to structure the practical activities of this background to allow the figure of focused management of hybrid resources and environments directly involved in the task at hand. On the other hand, the examples of creative use of home resources (family members as well as things) during lockdown also widened the span of acceptable means considerably. This raises the question whether the figure of students' engagement with hybrid resources and environments up till now has in fact been too restricted, building upon a too narrow background understanding of what counts as resources.

Concluding remarks

The aim of this paper has been to articulate theoretically how a Merleau-Pontian phenomenological methodology could be undertaken within Networked Learning. To this end, I have presented Merleau-Ponty's concepts of figure-background in perception and the role of the body in establishing figure-background in each specific situation. I have argued that a key Merleau-Pontian methodological strategy is to focus on breakdown situations, that is, situations where ordinary practical activity breaks down, because the breakdowns can provide indications about that which is taken for granted in the usual well-performed practical activity. I have further argued that this strategy allows one to target the "wide range of content … [without] a consciously felt phenomenal character" which the SEP entry poses as a problem for phenomenology. I have illustrated what Merleau-Pontian phenomenological analysis within Networked Learning could be with two examples: the figure of *eye contact via a webcam* and the figure of *hybrid networked learning situations of students today*. For both examples, I have highlighted what breakdown situations show about the background upon which the figure stands out and how understanding this background can change our understanding of the figure.

As a final comment, I wish to explicitly address a potential objection, namely that I, too, focus on explicating a figure, in that I discuss how the *breakdown* is experienced. That is, I discuss the *figure of the breakdown*. How, one might ask, is this different than thematizing for instance bicycling? The difference is that I use the figure of the breakdown situation to focus on the *background* of the well-performed practical activity. Whereas thematizing bicycling and claiming that the reported experience is also there in the well-performed unthematized bicycling activity is an attempt to describe the *figure* of well-performed bicycling. Still, a reasonable further question is how the Merleau-Pontian breakdown analyses of taken-for-granted aspects can then be evaluated for their truth or adequateness, if we do not have conscious access to these aspects and cannot thematize them in action. This question warrants a detailed discussion for which there is not room here. The short answer is that in lived bodily experience we can recognize the taken-for-granted aspects as familiar in much the same way as we know where our hand is through the actions we are undertaking with it (Merleau-Ponty's pipe example). Notably, when you understand this example from Merleau-Ponty and recognize it as an adequate description of knowing your body in action – you are precisely performing this type of evaluation by familiarity in lived bodily experience.

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What is it like for a learner to participate in a Zoom Breakout Room session?

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Abstract

Though virtual classrooms are not new, the COVID-19 pandemic sent many teachers and students online for the first time. This paper examines the use of a web-based video conferencing tool, Zoom, and in particular, the use of breakout rooms as part of a student's learning experience. We ask: what is it like for a learner to participate in a Zoom Breakout Room session? Using Max van Manen's (2016) phenomenology of practice, we collected learners' lived experience descriptions of participating in a Zoom breakout room, then reflected on them phenomenologically as a way to generate new insights into this recently common online learning experience. Four moments are portrayed: a learner's arrest at the announcement of breakout rooms; a learner's transition into a breakout room as existential suspension; surveilling self and others in a breakout room; and exiting the breakout room as a moment of foreclosure and re-disorientation. The paper compares Zoom breakout rooms with aspects of video-gaming and notices a detriment to Freirean problem-posing education if students can avoid standing, unmediated, behind just their words, even in the relative safety of a small group of peers.

Keywords

Zoom video-conferencing, breakout room, phenomenology of practice, Covid-19, lived experience, presence, The Pivot, small group learning, collaborative learning

Introduction

> *The black Zoom boxes with faces, pictures and names begin to disappear from the main screen and suddenly, I'm sucked away into another room with four other people. I scan their names and faces to see who's there. There is an awkward silence when someone says, "Ok. What were we supposed to discuss again?"*

In early 2020, the Covid-19 pandemic abruptly forced many teachers and learners out of campus-based classrooms and lecture halls and into kitchens, bedrooms and corners of homes to reconnect via virtual learning environments, video conferencing sites and other online educational systems. This remarkable shift from face-to-face to virtual learning was perhaps most iconically represented by the spectacular rise of Zoom's web-based video conferencing software in education. Charged overnight with teaching online, educators scrambled to reimagine their undergraduate classes as a shared slideset in one window, a framed talking head in another, situated among a gallery of (semi-present) students, and sometimes augmented by a stream of comments and queries in the chat.

Lecturers began experimenting with different backgrounds, adjusting their lighting; they tried to eliminate the glare on their glasses, and to reduce wrinkles with Zoom's "touch up my appearance" feature. They read about

security concerns and how to prevent Zoom bombs. Some instructed students on how to raise their hand icon if they had a question, reminding them to unmute—or mute—themselves. Others fretted about time zones, figured out how to use a Zoom poll, and schooled themselves how to set up, launch and then bounce between the eerie seclusion of multiple Zoom breakout rooms (ZBRs). Mostly they struggled to replicate the once vibrant intimacy of their in-person classes.

On the other side of the screen, learners were also experiencing new and unexpected challenges: some were tuning in to Zoom with children or pets underfoot, while preoccupied with unanticipated financial insecurity or grappling with mental health issues or other barriers to their learning. Some cursed (mostly unheard) about their unreliable wifi, or their painfully underpowered laptop; some were simply upset that they had been robbed of the campus-based experience they had been so looking forward to. They worried about their privacy and how to hide their messy bedrooms. In the midst of this pandemic-induced upheaval, we educators may have begun to wonder: what is it like for our students to learn via Zoom? In this paper, we home in on one aspect of this decidedly 21st century, networked learning experience: what is it like for a learner to participate in a Zoom breakout room session as part of their Zoom classroom experience?

But first: what is Zoom and what is a Zoom breakout room? Zoom is one of many internet-based video-conferencing applications—including Microsoft Teams, Adobe Connect and GoogleMeet—being used by Post-Secondary Institutions (PSIs) to convene recordable spaces for teachers and learners to meet synchronously. When launched, Zoom defaults to take over the user's entire screen with a mix of rectangular boxes re-presenting oneself and the other participants who are tuned in. Participants can choose whether they are visible, that is, streamed via live video camera, and too, may select a virtual background covering over their surroundings. If the webcam is turned off, the participant will appear as simply a name in white Arial font on black or as a preset image with their name listed below.

Zoom meeting software also supports breakout rooms (ZBRs) that allows the teacher (the "host") to divide a class—via random, preassigned or self-selection—into smaller groups to talk among themselves. When the breakout room feature is launched, Zoom takes over each participant's entire screen—just as happened when the participant originally joined the Zoom session. The breakout room space looks just like the main Zoom room, except with fewer participants. The teacher can also move between breakout rooms, broadcast short text messages to everyone in the breakout rooms. A help icon allows students to call the teacher to visit their room. A timer function can be set to force everyone back to the main Zoom room when the timer expires. Here, a warning may be activated, where 30 or 60 seconds pops up on participants' screen, counting down to let them know when they will be returned to the main room. Participants can then elect to return to the larger group; if they don't, Zoom will shortly do it for them. Zoom breakout rooms seem to promise to replicate the productive huddles of small group work and dialogue with peers in face-to-face classes. Yet, we may wonder: what *is* it like for a learner to participate in a Zoom Breakout Room session?

Literature Review

The use of video conferencing for synchronous teaching and learning is not new (eg. Goodfellow et al 1996; Watson 1996) but, within that context, breakout rooms, and research into them is more recent. Some of the benefits identified in using breakout rooms include increased flexibility, engagement, interaction and student support (Cadieux, Campos-Zamora, Zagury-Orly and Dzara, 2020; Chandler, 2016; Serhan, 2020). Cautions for using breakout rooms have also been noted, including that teachers and students must possess adequate technical skill, confidence and support to be successful. Additionally,participation can vary significantly, and "Zoom fatigue" can impact learning (Chandler, 2016; Lee, 2021). Saltz and Heckman (2020) posit that breakout rooms do not necessarily increase student engagement without thoughtful lesson designs that maximize the benefits of small group work. Missing from the research-to-date is a view of the lived-through, everyday experiences of learning online in breakout rooms.

Methodology

To study the lived experience of participating in a Zoom breakout room as a learner, we employed van Manen's (2016) phenomenology of practice. A phenomenology of practice orients the researcher to the prereflective dimensions of everyday life, demands they "cultivate unwilled willingness to stand in wonder" (Adams & van Manen, 2017, p. 783), and engages both philosophical and qualitative research methods in an effort to reveal taken-for-granted aspects of the phenomenon of interest. We began by gathering lived experience descriptions (LEDs)

of our own (the four authors') experiences as learners in ZBRs over the past year. We edited them to remove extraneous detail, then together developed multiple themes based on micro (line-by-line), macro and existential analysis. For this conference paper and due to page limits, we chose four anecdotes (edited LEDs) among the many we had generated. Our selection criteria was whether the anecdote showed a different temporal or transitional moment of the ZBR experience, specifically: what it may be like for a learner just before entering a ZBR, what is may be like to enter the ZBR from the main room, to arrive in the ZBR, and finally to exit the ZBR. Due to page limits, we necessarily could not include many other experiential aspects of learners' ZBR experiences that occurred outside these four transition moments. In the process of writing and reflecting phenomenologically on each of the four anecdotes, we performed different aspects of the epoché and the reduction including the eidetic reduction (van Manen, 2016).

The announcement of a Zoom breakout room may be heard by the learner as an inconvenient interruption and a demand to engage

> *I'm sitting at my kitchen table, cup of coffee in hand trying to concentrate on the Zoom session on my screen. I'm finding it hard to focus and sneak in a few emails. Half listening, I grab a piece of bread to put in the toaster. The instructor carries on, unable to see me wandering away from my laptop. I notice a few crumbs on the counter so I wet a cloth to wipe away the mess. My toaster dings. I hear the teacher announce, "Now, I'm going to send you to a breakout room to discuss your experiences with a smaller group." Oh great. I'm going to have to turn on my camera and really pay attention. I can't eat that piece of toast on camera either. I really don't feel like talking to other people right now.*

For a learner, a synchronous Zoom class may fade from their attention to become just another window on their computer display: yet another marginal activity in their busy, preoccupied life-world. Emails may be attended to, social media checked, articles scanned, papers started, online quizzes completed, calendars updated, daydreams dreamed and vacation breaks planned. In some ways, this "distracted", multitasking screened environment hardly differs from lecture halls, students staring at open laptops or tethered to smartphones (Aagaard, 2015). Yet in the shift off-campus to learning from home via Zoom, the warm-bodied surround of the learner's peers, the hum of their shuffling, coughing and keyboarding is now absented; the lecturer is no longer in a position to make eye contact, so there is no need for the learner to wonder whether to keep their eyes averted or available, "mutually enfolding glances" (Merleau-Ponty, 1964, p. 17) are impossible.

By comparison, the physical classroom walls and conventions may be the only limitations of the learner's ranging eyes, noticing someone, sneaking a candy so as not to risk sharing with others or flaunting their snack before devouring it whole. In a face-to-face classroom, classmates may become familial by being in each other's presence. They may notice a person's particular way of speaking or recognize a distinctive laugh or cough. Friendships may begin to form during the in-between moments of waiting for class to begin, at break time or while packing things up at the end of a class.

In Zoom, a learner can choose what they reveal of themself, and, with microphone and camera off, there is no audience to impress with repertoires of 'good student' behaviour, such as sitting up, looking at their notepad or the lecture being delivered. In the buffer-zone of Zoom, no one knows if they are in raptures or blowing raspberries. The absence of civilising obligations may disinhibit the learner in more subtle ways, where they may slip into a kind of monitoring, with the class on the brink passing into mere background noise. If using Zoom on a mobile phone or listening through wireless headphones, affording greater physical latitude, the radio wave connection offers a metaphor for the learner's even more tenuous connection to others in the class. Zoom may create a kind of shield where users can sit in solitary spaces such as an office, a kitchen, or bedroom, choosing how much to reveal. Much can be hidden if cameras are off and microphones remain muted. Perhaps all that is disclosed is a name whereas pajamaed bodies, a mess and marginal attention are a secret.

The insulated world afforded by Zoom may be threatened by the announcement of a breakout room activity, which can sound an unwanted demand for the learner to stop whatever they are doing, pay attention to the teacher's instructions, and ready themselves to engage with others in closer proximity. Fellow learners could also be expecting all to be present–to listen and to speak. The news that small group work is about to begin may jar the solitude and preoccupations of the learner's space. For others, the opportunity to converse with peers is a welcome change from a more one-directional experience. And technology itself can break down barriers to participation. Facilitators and learners can interact without having to be in the same physical space. Collaboration can take place

using shared documents and applications. A randomized grouping afforded through ZBRs may enable learners to interact and work with classmates they would not have otherwise had a chance to talk to in a large lecture hall.

As the size of the ZBR grows there may be an increasing degree of insulation, intensifying a contradiction of the ZBR promise – the opportunity for intimate exchange. Perhaps the ZBR is experienced as differing experiences, depending on the size of the group, with increments of size. The more participant windows that may compete for attention, the more distracted they may become. As cameras that are switched off the more learners may feel far from a shared experience, and fall back into their immediate world.

The learner may experience the transition to a ZBR as being forced through a moment of non-existence

> *The facilitator announces that we'll shortly be moving into breakout rooms to reflect on the ideas shared so far. I immediately feel dispirited: Do we really have to? I am not enthused by the prospect of rushed, unstructured and surveilled chat with strangers. The facilitator says we will have 10 minutes. My heart-rate speeds up, my stomach churns. The urge to quit the session flashes, my mouse hovers over the red "Leave" button at the bottom right hand of the screen, a tantalising escape-route. A new box of text appears on the screen confirming the impending transition to breakout rooms. I float my mouse over the "Join Breakout Room" button as I flirt with freedom, but feel burdened by the potential scrutiny of the facilitator if I fail to decide quickly. I click "Join." There is a flash of quiet and I am vaporised for a split second. As the screen transitions, a green arrow points to four squares cycling two shades of grey…and I'm in.*

To a learner an assignment to a breakout room (see figure 1) may present an unwelcome interruption and a Hobson's choice: acquiesce, hit 'join' to meet one's sub-group and start working with what may be unknown others, or stay stranded alone with the host, as if caught out of class in the school corridor without permission. The learner may wish to flee but feel forced on, yanked to the ZBR arena. Reluctance may be based on previous experiences of a ZBR, perhaps with a couple of incommunicado names where no-body talks. They may wonder if their efforts to engage will be successful or become drowned by mindless chatter or lost in a gulf of eerie silence.

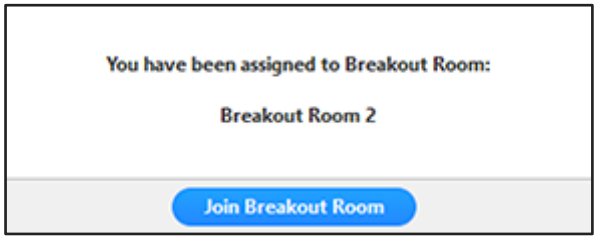

Figure 1: You have been assigned to Breakout Room

Each learner arrives at the breakout room from their own virtual trap-door, and, unless membership is preassigned or repeated from a previous ZBR, random allocation leaves the learner with no clue as to whom they will meet; no preemptive sociation is possible, such as sizing up others from across the room, or awkward snickering with an acquaintance before moving into a group. An embodied transition requires effort to move and steer weightful passage through the rich incidental world between places. In Zoom, the learner can select 'join', taking a virtual leap of faith or, even if they linger, a new box tells them about their conveyance, they are 'Joining Breakout Rooms…' (see figure 2), and this 'may take a few moments'. The learner can calmly await the results of being thus processed. But their virtual self amounted to little enough in Zoom and now perhaps even feel that has been snuffed out. They may wonder where they have gone and feel after themselves, like the instinctual and erratic maneuver of the hand when seeking a lost computer mouse cursor, an impulse to reunite soul, body and on-screened extended self.

Figure 2: Joining Breakout Rooms

For Heidegger, Dasein is always 'up to something' (Inwood, 2000), but any subliminal scheming must surrender to the maneuvers of the facilitator actuating Zoom's levers, each fateful keyboard or mouse move palpably sensed by hapless participants as virtual juts into their world, this time as if casting each participant into a virtual vacuum, diminishing their ability to know what to do next, wondering whether this vitrification will end in reconstitution, or have they been vaporized, virtually terminated, condemned to drift disembodied in the swirl of Internet currents, falling away from the session that must have started without them. This weightless wait may be experienced as unnerving, although in others perhaps it is only barely noticed as a mildly frustrating moment in which to pause, sigh and gather thoughts, or dash to the restroom.

How much of the transition lag is designed in? What if opening the rooms were instant rather than prolonged in a micro-period of anticipation as group members free-fall from the main Zoom room? There may be less time to weigh ideas such as, 'do we really have to…?' Why not just leave the whole charade entirely and read a book? These questions may generate sufficient cognitive dissonant dithering to tip the participant into the breakout room before they knew it or chose it. Being 'done to' in educational settings may seem an unreasonable violation of an individual's autonomy. Even though anyone might expect a pedagogue to make pedagogic moves, resistance is futile in Zoom. Zoom's lack of transit time or "threshold spaces for indirection and improvisation" (Friesen, 2014, p. 22) leaves the distracted or unprepared student at a strait: to snap-decide upon their capacity to immediately sufficiently ramp up their availability and engagement *viz* the online class relative to their in-person situation. If they do not convey a positive vibe into the ZBR, this might affect the effectiveness of their latest, if randomly assembled, team, and they may not want to be that *fait accomplis* who, before it starts, perhaps jeopardises this fleeting opportunity to learn. Learners may dislike Zoom breakout rooms, but a sense of inertia and commitment to the educational enterprise and the particular session may be enough so that they passively aquiesse to meet their fate and play along with whatever game awaits them. As Gadamer (1992, p. 102) says, "Play fulfills its purpose only if the player loses himself in play.... Someone who doesn't take the game seriously is a spoilsport."

When breakout groups happen in-person, the entirety of a learner's presence in the room is harder for the educator to oversee and manage. A willful learner can remonstrate, if not negotiate; the dragging of chairs and heels, huffing and puffing - perhaps no-one would notice, but there may be some gratification in knowing they could. Even such low-level sedition can contribute to the group's nascent sense of identity on the way towards productive work. If the announcement of ZBR's comes as a surprise, the learner may feel cheated out of the necessary time to prepare themselves for new levels of engagement and cast around mentally: shorn of the micro-decisions entailed by equivalent maneuvers in the physical world, the invitation to 'Join Breakout Room' may strike the learner as insincere, rushed or forced, jolted, *'as if by cattle-prod', subsumed as one of* a *gallery of others*, which may excite anxiety's 'knot in the stomach'; disorientation is not much preparation for reorientation. Learners with ZBR experience know there is no seat at the back or way to slip out unnoticed once emblazoned on the newly intimate screen, no escape from scrutiny. Some may instead avert the spotlight by continuing with their camera off; some arrive with a knot in their stomach. Perhaps stunned by the prospect of a ZBR, the learner may try to retain what was just said about what they were supposed to be doing, but fulfilling that purpose depends on who else they end up with. The learner must quickly process their pending exposure and discomfort of the unknown others in p*ermutation of stranger, friend or voyeur'*. A feeling of 'being done to' may result in a ZBR opportunity being perceived as illusive; the mandate to perform may cloud the positive possibilities of closer engagement with others. The experience of being processed by the technology at speed may be unnerving, an unexpected dividuation from the main session may present as an ambush, inflicting a burst of physical or emotional trauma; trepidation of 'what lurks ahead', some pending awkwardness may negatively infuse one's mood.

The simplest option for Zoom hosts is to populate ZBR's by automatic random assignment. The main alternative is pre assignment, but this is less likely as it requires preparation. Reassignment is possible for the second ZBR in a session, allocating learners to their previous group. As the pandemic progressed, students were increasingly less likely to meet their peers in-person, and randomised large classes could throw learners into ZBR's with unknown and, as yet, untrusted others, obliging a repeat of stunted introductions where presenting the self in such a time and screen-constrained context may make the words, 'Hi, I'm Jennie', seem more perfunctory than when in-person, however nicely rendered - especially if the word Jennie is visible but Jennie is not. With so little of each other to go on, some may struggle to parley candidly or feel free to make the mistakes necessary to dauntlessly progress epistemic tasks. The square black hole with a 'name' hovering over its gape thins us out ontologically and, compared with the main Zoom room, this intensifies in a smaller ZBR group, which was supposed to provide a more intimate occasion. McLuhan (2001) suggests that sunglasses make a face 'cool media', drawing us out in mystified completion of what is hidden, but faced with Zoom participants behind their uncanny black squares leaves the learner with no body to interact their settling down sociation audition with; the polite cough, gesture, looking and shifting around, that unveils their personality. For the learner to keep their camera on where others are presenting black squares requires resolution in the face of vulnerability akin to remaining at a masquerade ball without a mask.

A learner may find themselves preoccupied with the appearance of others in the ZBR or with their own video-streamed image rather than engaged with the assigned task at hand

> *Arriving in the breakout room, my image materializes among four others already doing introductions. I scan their faces and names quickly, trying to take everyone in at once. I'm immediately caught by a brightly lit show-room kitchen, its occupant wearing a dressing-gown. Two rectangles away, a dense and ordered wall bookcase stands as background to a professional looking male, though I'm not sure it's real. I'm only half listening to the breakout room conversation. Instead, I find myself focusing on a woman with a number of white spindles behind her, trying to figure out exactly where she is located; she appears to be in, or rather, has her back to a hallway. Another woman is sitting relaxed on what seems to be a dark coloured couch: there isn't much light. A new entrant—a younger man in a Hawaiian shirt—slowly materializes below me.*

Entering a ZBR, the learner may find themselves drawn to and preoccupied by the other participants, especially by their bright or unexpected attire, or a striking, unusual or incomprehensible background. Like Sartre (1956) "moved by jealousy, curiosity, or vice" peering through a keyhole and ear pressed against the door, Zoom's little rectangular windows offer the learner "a spectacle to be seen…[and] a conversation …to be heard" (p. 259). Each window opens a keyholed glimpse of another's life—housecoat, florid dress shirt, cluttered bedroom, drab lighting, strange objects or fancy furniture; each porthole offers an infinitely observable view of the other within the limits of the rectangular frame.

Yet unlike Sartre's keyhole peeper, there will be no distant footsteps to threaten the ZBR participant's unfettered freedom to surreptitiously observe and eavesdrop on their fellow participants. In a ZBR, the learner may quietly and at their leisure examine the other participants from a place of open concealment. As long as they direct their gaze in the general vicinity of their webcam and screen, the voyeuristic eyes of the learner remain shielded from the reproach of others. The target of their peering curiosity is hidden. Zoom's shadow box display of labeled and webcammed participants (Figure 3) is "at once both instrument and obstacle" (p. 259).

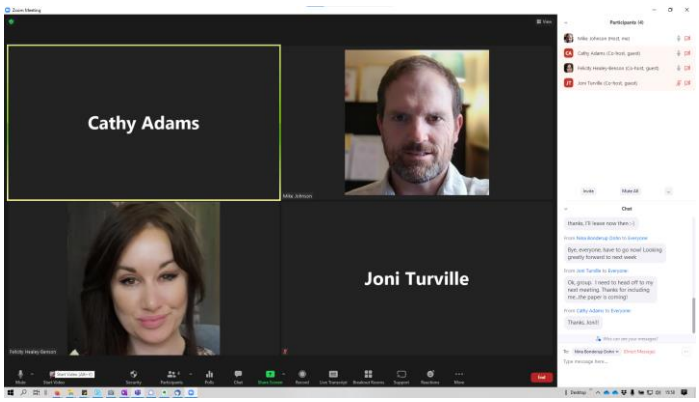

Figure 3. In the ZBR

Momentarily consumed with examining the others in the ZBR, the learner

> ...has no "outside"; it is a pure process of relating the instrument (the keyhole) to the end to be attained (the spectacle to be seen), a pure mode of losing myself in the world, of causing myself to be drunk in by things as ink is by a blotter in order that an instrumental-complex oriented toward an end may be synthetically detached on the ground of the world (p. 259).

The Zoom ensemble—screens, webcams, mics, hardware, software, wifi and networks—compels "new acts" (p. 264). Further, "every act performed against the Other can on principle be for the Other an instrument which will serve him against me" (p. 264). Here, the learner is dimly or acutely aware that they themselves can simultaneously "be-seen-by-another". Yet they can also never be assured of this because in Zoom, there is no "convergence of two ocular globes in my direction" (p. 257). Instead, the look of the other is at best "probable." As Sartre shows, "it is only probable that behind the bush which has just moved there is someone hiding who is watching me" (p. 258). Further,

> What I apprehend immediately when I hear the branches crackling behind me is not that there is someone there; it is that I am vulnerable, that I have a body which can be hurt, that I occupy a place and that I can not in any case escape from the space in which I am without defense—in short, that I am seen. (p. 259)

I do not need to "see-the-Other" to know that I may simultaneously "be-seen-by-the-Other." Nor can I know "that those eyes which are fixed on me are eyes; they could be only 'artificial ones' resembling real eyes" (p. 275). For the learner in a ZBR, the impossibility of meeting the eyes of another person in Zoom also means that they may stare at and examine the other participants without impunity.

> *I'm the first one to arrive in the breakout room and I see my face looming large on the screen. What is going on with my hair today? I hurriedly try to slick down a piece that seems to be standing up straight. Oh wow…I can see my kitchen clutter in the background too. I quickly turn off my camera so I can straighten up behind me. I hadn't noticed the disarray when my window was so small in the larger group. Others quickly begin to appear; I turn my camera back on. We begin the conversation but I can't quit looking at the hair that just isn't behaving. My face looks a bit puffy too. I try to focus on the conversation but my attention keeps drifting back to my own image.*

Seeing oneself televised "live" in a ZBR, a sometimes larger-than-life version of one's face, neck and shoulders silhouetted against a backdrop of what otherwise exists unseen behind them, may similarly distract the learner from their educational task at hand. Like Narcissus of Greek mythology arrested by his reflection in a pool of water, a learner arriving in a Zoom breakout room may find themselves gripped by the webcammed version of themselves and their surroundings on screen. Preoccupied with how their appearance may be perceived by others arriving in the breakout room, the learner may seek to quickly adjust their windowed image in different ways: surreptitiously grooming themselves, jumping up to adjust their lighting or tidy their surroundings, turning off their webcam momentarily to push a pile of dirty laundry out of sight or to access Zoom Preferences to swap in a virtual background.

Fussing over one's appearance in a mirror is hardly a new phenomenon. Outside of one's home, walking by a mirror, a window or a shiny door, one may find themselves glancing at their reflection. Noticing something amiss, one may be briefly arrested in their tracks. But in the midst of a classroom activity, such preoccupation may be unfamiliar. In a Zoom class and especially in the intimacy of the breakout room with webcams on, a learner may find themselves staring at their own image but also examining, judging or "fixing themselves up." Further, it is not just one's face and upper torso, but one's background...

When presented with their image moment by moment, hour after hour, day after day, students may become more aware of their perceived imperfections and desire to do something about them. In their article, "A Pandemic of Dysmorphia: 'Zooming' into the Perception of our Appearance" in *Facial Plastic Surgery & Aesthetic Medicine,* Rice, Graber, & Kourosh (2020) discuss the trend of people becoming more self conscious and, in some cases, body dysmorphic disorders being triggered through the constant confrontation with their own Zoom image. Video

meeting tools also create the opportunity for users to readily compare their image to others because of the way the tools position images next to one another. Rice et al. attribute recent increases in cosmetic procedures and treatments in part to the overuse of video conferencing during the COVID-19 pandemic. They label this kind of overly self-critical analysis as "Zoom Dysmorphia" (p. 402).

As the Zoom breakout room comes to an end, an engaging discussion may come to a perfunctory ending, midstream

> *I try to listen intently but I'm distracted by the countdown timer fast approaching zero. She is in mid-sentence when the screen tells me I'm being automatically taken back to the main room. The facilitator welcomes us back and wants us to talk about what we learned in our breakout rooms but I'm stuck thinking about how close I got to hearing about the crux of my issue from another participant. I wonder if I can somehow share contact information with her, but I feel the moment is lost.*

Irrespective of how the ZBR session is progressing, at a certain point, a box may appear centre-screen, with the option to leave a little early or be ejected at zero (Figure 4).

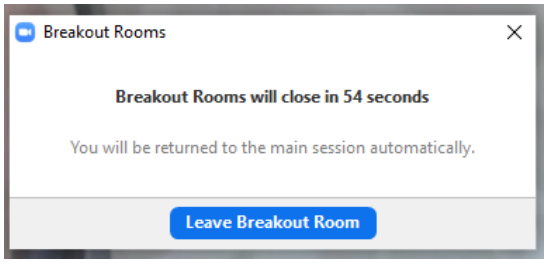

Figure 4: Breakout Room 60-second countdown timer

The unheralded arrival of this box may invoke a sense of panic, the speaker accelerating to conclude their point. The countdown timer ruptures and then threatens to imminently collapse of the co-constitutive togetherness of the ZBR conversational world that has finally convened. Some participants may just wait out the end in a suspenseful contortion of winding down, whiling away, scattering vain glances at the screen squares. Others may take the opportunity to sneak off early. Long goodbyes are just not an option, the final seconds like those of a concluding elevator ride. With so little time the learner's focus may be more acute, *a lá* Parkinson's law, and concentrated effort may make time fly.

Moments of understanding may be liminal or rare, so a participant may be riled and dismayed if their specific issue was about to be addressed but instead the line of thought is chopped and bereft of its promise. As if clutching at an escaping fish just landed, only determined ancillary effort might rescue something from this lost opportunity, with only ephemeral irrelevant traces of the group, of a notably Hawaiian shirt and that girl who looked far too ill to join if this had been held in-person. For others, where exchange has run dry, the timer may extend a form of Purgatory. The less brazen may act normal, whatever that is. An awkward smile, giggle, or vacant gazing, or the glazed autocue-tracking look that betrays a switch to other screen-based work. These busy types have broken out early - they will or can not be held zoom hostage, same for the one who fled leaving live footage of a vacant chair. Some decide there is little point trying to say more, while others may try, right up to the wire.

As the end draws on, clipped exchanges punctuate the awkward silence in the long seconds approaching expulsion. Time has the final word: no bore or rebel can hold forth King Canute-style in defiance of this tide. If a learner wants a last word, they must air it out around the T-minus sixty second mark or it may be lost in the cacophony of micro-partings. Time can change the experience of the space for learners, foregrounding the process and the technology over the human exchange, as a form of Heidegger's (1977) "Enframing" or "Positionality" (*das Gestell*). Technology is neither neutral nor insignificant in its role. It (re)shapes our thinking, being and doing in the meeting space: we may find ourselves performing in a more intense way, eye contact with conversational others is strangely elusive, and even our words can feel amplified and framed in our individual windows.

In the final few seconds, a participant may sneak a parting duck, smile or "Zoom wave", a gesture that resembles a young child hand-waving. These exaggerated gestures may signal a participant's attempts to make up for the

sense that the situated, shared and embodied lifeworld is depleted in Zoom. Practically, the Zoom wave shows, mute or not, they were in it together for that event and, muted or not, a wave signals closure and release, unmistakably conveying farewells, transmitting a flicker of humanity and mutual appreciation - each waver valued others in the room sufficiently to survive to the end and share and frame this moment of parting, sealing it as an event. The time, never to be recouped, was spent together. Wavers show commitment in that attention levels are sufficiently maintained up to and through the shared finale vibe. Perhaps exaggerated waving will transfer to in-person valediction now that handshakes are dangerous in the world of COVID-19.

At zero, the final breakout room timer guillotines the group like a silent supervillain. Unless designed to blur them, the digital lends an unnerved and unnerving precision to virtual spatial-temporal boundaries. The learner's hardware is either in the ZBR or out of it. Five minutes is exactly 5 minutes—to the split nanosecond. The 'in' and 'out' are sliced with stark precision. For the learner, however, with interpersonal connection rendered then rent, falling away may happen for long enough to feel it as they snatch at memory fragments of an unconcluded point or fading screen name.The ZBR's end is incomparably abrupt. Only in the strictures of the examination hall would teachers demand *all* activity cease, and even then, 'pens down!' is powerful but not omnipotent. In class, it would be difficult to imagine a teacher walking between two conversants, stopping them, gagging and blindfolding, and then escorting each back to their seats without a chance to conclude. In Zoom, when the timekeeper cannot be seen, students may feel "plucked" out of one conversation and dropped into another, mid-sentence, or even mid-word. Facilitators may soften the severing blow through visiting the groups to gain their assent to ending them or inject a text-based announcement that arrives as a 'voice from on high' as a warning that the ZBR time is coming to an end.

The climactic moment of release and rematerialising desiccates the small ZBR groups. It may invoke childhood memories of dizzily arriving at the foot of a grassy hill having rolled sideways down it with others—queasily coming to—where is everyone else? If the session requires group representatives to give feedback to the larger group, those individuals may still feel the need to confer with their group, but they are bereft of a group back-channel or in-person tactics, such as gesturing at flip-board headings. They cannot scatter glances around their group for affirmation or hear whispered suggestions or scan hastily scribbled notes. All these may be harder at a distance, of multiple screens of black boxes away - group members, only recently so close and productive, now sprayed somewhere among the checker-board of peers.The looming end serves notice on whatever level of usefulness, awkwardness or camaraderie that had developed in the ZBR.

Concluding Thoughts

During the COVID-19 lockdowns, video conferencing software established itself as a key technology in the pivot to online learning. Such webtools are likely to remain popular, especially where neoliberal aims of reduced financial costs and greater productivity are privileged. More difficult to predict is whether attending in person again will be a reminder of what was lost and once again in-person will resume as the 'old normal'—learners orienting enfleshed freedoms and limitations on the fly, especially in small group work. If *mitsein* (being-with) is noticed by entrepreneurs as valuable to education, networked learning technology will advance to emulate it. Dazzling refinements to holographic technology are entering the market, realising science fiction's predictions of life-sized, 3D images of people that share space, body language and eye contact (Murad & Smale, 2021).

In some respects, a learner's experience of a Zoom Breakroom seems to resemble that of the solitary videogamer launching a game and being flung into a new virtual existence to accomplish a pre-ordained mission. A ZBR arguably detracts from engendering a convivial scholarly learning environment: virtual violence to the learner's experience of time, screen locale, voice, and intersubjectivity may leave an enduring detriment on education, since Zoom host god-like powers are firmly in hands of already powerful pedagogues, reinforcing students as "adaptable, manageable beings" (Freire, 1970, p. 57).

Always a simulation, the mediated human may not be doing the same as their flesh, which adds a hermeneutic layer to transcend through trust when more intensively interacting, as in a ZBR. Perhaps learners will prefer to diffuse the ZBR spotlight using different veils than the crass binary of camera on/off, switching their avatar to 'burka' or 'pay attention' modes. The technical trajectory to make the virtual still more life-like might not equate to *more human* though. Learners may enjoy adding a virtual beauty spot or 'tidy room' background, but the facility to easily interact with their group before and after a ZBR would be better for collaborative learning in small groups. Such affordances could be integrated, however tools are never neutral: "We shape our tools, and thereafter our tools shape us" (Culkin, 1967) and, such shaping, broadened to Bildung, which, according to Gadamer (1992, p.

10), is more than "capacities and talents", even the mysterious cultivation of God's image in us. Thus the undergraduate vision for learners is stunted if, even in the relative safety of a small group of peers in these formative years, they never have to front up, and stand, without filters, behind their words, authentically enacting *alethea* (truth as *unconcealment*), putting their body on the line in the face of 'the They' (Heidegger, 1962). Zoom as *screen*, and ZBR's especially, may confound *alethetic* dialogue essential to *problem-posing education* (Freire, 1970).

While Zoom breakout rooms promise to provide more of a small-group learning experience, that is far from all they do, and we should still *wonder* about the impacts on relationships, engagement, presence, and identity in online classes and beyond them.

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Networked learning in the time of pandemic: Intersubjectivity and alienation

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Abstract

Digital networking technologies have allowed lecturers and students to remain connected while being physically isolated during global lockdowns resultant from the COVID-19 pandemic. We argue that the increased utilization of online spaces for teaching and learning during the time of isolation has brought the question of intersubjectivity and alienation in cyberspace to the forefront.

As part of an ongoing phenomenological analysis of the virtual, we survey the experiences of networked learning reported by a group of South African university students in their end of course surveys. We track particularly their experience of alienation, their capacity to engage with material in the online environment, and their awareness of self as a learner.

For Merleau-Ponty there resides in intersubjectivity a founding corporeity that serves to explicate the composition of the intersubjective world as based in a plurality of anonymous subjects and in the intersubjectivity of intellectual consciousnesses. In terms of the virtual, a redeployment of Merleau-Pontian thought (and particularly his concept of the flesh) reveals that the body-subject and digital technology artefact are co-implicit in the generation of the virtual. The virtual serves as a point of networked intersubjectivity that concretely expands and constrains human experience and behaviour.

Furthermore, in the virtual we navigate a reified landscape. Virtual reification, though seemingly a contradiction, sees us treating the virtual as concrete from the basis of our embodiment. This leads us to an alienated networked intersubjectivity, whereby all potentialities are founded in ordered and carefully arranged systems that promulgate pragmatic and capitalist logics.

We investigate how reification makes up the virtual, and how our engagement with the virtual points us back to the nature of alienation (indeed, for Marx, alienation is an intersubjective social relation). We find in the virtual therefore not isolation, but rather a deficient mode of intersubjectivity. While the individual never becomes atomized, for even in the virtual a deficient mode of intersubjectivity remains nevertheless a mode of intersubjectivity, we find that the individual functions as part of a deficient and distorted network. We suggest in conclusion certain teaching methods that may minimize or mitigate students' experience of alienation.

Keywords

Intersubjectivity, Alienation, Merleau-Ponty, Pandemic, Online Pivot, Video Feedback,

Introduction

The COVID-19 pandemic represents a continuing crucible for teaching and learning in higher education institutions – especially those institutions forced into so-called 'emergency remote teaching'. While digital networking technologies have allowed lecturers and students to remain connected to each other while being physically isolated during global lockdowns, we argue that the increased utilization of online spaces in this regard has not been unproblematic. Students have reported negative effects upon their capacity to engage with learning material and an altered awareness of themselves as learners. Furthermore, both students and lecturers report feeling distanced from each other.

Such experiences, noted by both students and lecturers, seem to highlight two central issues that we argue are crucial for conceptualizing (and rethinking) the ways in which we conduct online teaching and learning. Firstly,

such reported experiences suggest that we need to consider how individuals encounter each other in virtual space - therefore, the question arises, what conclusion can we learn concerning intersubjectivity in cyberspace in the current context of pandemic-necessitated online teaching and learning? Secondly, how can the feeling of being 'disconnected', as noted by both students and lecturers in online teaching, be explained? In other words, are these students (and lecturers) experiencing a form of alienation in cyberspace? If so, what does this form of alienation entail?

As part of an ongoing phenomenological analysis of the virtual, we survey the experiences of networked learning reported by a group of South African university students in their end of course surveys and through informal feedback provided to lecturers. We track particularly their experience of alienation in terms of their capacity to engage with material in the online environment, and their awareness of self as a learner.

Intersubjectivity and Intercorporality

In this study we make use of phenomenological perspectives to explicate student and lecturer experiences of online teaching and learning. A challenge as regards the use of phenomenology in describing the virtual in this context is represented by the critical perspective that asks whether this school of thought in general, and particularly its accounts of embodiment and corporality, have become more and more marginal exactly due to the predominance of virtual engagement in contemporary societies.

Sceptics claim that the early phenomenologists, such as Husserl and Merleau-Ponty, could not have foreseen existing forms of digital communication technologies, and that contemporary applications of canonical phenomenological works are therefore archaic in their engagement with technological questions. It is postulated that modern technologies are breaking down and altering old concepts of bodily presence, often displacing phenomenological arguments for arguments that favour disembodied accounts. So, for example, Han (2013) argues that "the digital medium divests communication of all tactility and corporeality." Similarly, the problematic nature of concepts such as 'presence' in the computer age had already led Marvin Minsky to, in 1980, coin the term 'telepresence' as alternative to accounts of physicality in interpersonal communication (Minsky, 1980). See also Norm Friesen's discussion on telepresence and tele-absence (2014).

While these points of criticism seem to be potent at the offset, we find that (as inherent response to such criticism) it is exactly phenomenological concepts are increasingly being adopted *from* phenomenology *into* other technical fields. An example of this is found in Artificial Intelligence studies, a field which has taken questions of embodiment and corporality seriously since the 1980s, as Hubert Dreyfus highlights (Dreyfus, 2001: 9-24). Increasingly, we have seen such concepts begin to play a crucial role in the programming of AI systems in the present day (Floridi, 2020). Indeed, phenomenological concepts are more likely to see expansion rather than complete revision in the face of continuing technological development.

In this paper we argue that intersubjectivity – a canonical phenomenological concept – presents a similar concept for making sense of contemporary digital technologies in general, and of the virtual specifically. Intersubjectivity, or other-awareness, relates to the question of how the other exists for the subject (Carr, 1973). The concept is particularly well developed by Husserl in his *Fifth Cartesian Meditation* wherein, rather than placing the other "outside" one's experience, he places it within the realm of one's inevitably intersubjective perception of objects in the world (as part of his three-fold account of the body). Thereby, he highlights the other in the context of the various aspects of embodied experience. For Husserl, one experiences the other not as an object but as a subject, based in the empathy that one feels for the other – indeed, one experiences the other in terms of their embodiment. In turn, the experience of the other shapes one's own self-awareness (understood as I am an other for an other person).

The Husserlian concept of intersubjectivity is advanced and developed by Merleau-Ponty in *The Philosopher and his Shadow* (1964) through his description of intercorporeality – famously illustrated by his description of mutual touch in the image of shaking hands. As regards the encountering of the other, he says:

> The reason why I have evidence of the other man's being there when I shake his hand is that his hand is substituted for my left hand, and my body annexes the body of another person in that 'sort of reflection' it is paradoxically the seat of. My two hands 'coexist' or are 'compresent' because they are one single body's hands. The other person appears through an extension of that compresence; he and I are like organs of one single intercorporeality (Merleau-Ponty, 1964: 168).

His description recounts the immediacy of perceiving while also being perceived, the physicality that allows for an intersubjective awareness through one's practical orientation. Intercorporeality is therefore for Merleau-Ponty, first and foremost, a reciprocity of one's own body and that of another, for he argues (along Husserlian lines) that we engage with the other not as a mere object (*Körper*) but as a living being that appears to the self in activity (*Leib*). For Merleau-Ponty there resides in intersubjectivity a founding corporeity that serves to explicate the composition of the intersubjective world as based in a plurality of anonymous subjects and in the intersubjectivity of intellectual consciousnesses.

A crucial aspect of Merleau-Ponty's intercorporeality is its basis in physical excitation, which begs the question as to how such intercorporeality may be understood to figure into digital screen-based communication technologies. How do we recognise such intercorporeality when we as lecturers are presenting an online class using Zoom, for example? When presenting a university course online there is no physical presence, for indeed the technology utilized serves to connect individuals over distances while keeping them physically isolated (a prudent course of action due to the infectivity of Covid-19, and as is regulated by lockdown conditions during the pandemic). In the physiological sense, participants are at a remove from one another to prevent the spread of a contagion – indeed, to understand virtuality in this context requires a recognition that corporeality has moved beyond the realm of shaking hands. Rather, the shaking of hands during the pandemic is highly discouraged.

In a contemporary, though non-technological register, Tanaka (2015) sees intercorporeality as a theory of social cognition that allows for the recognition of the other through behaviour matching and primordial empathy while simultaneously generating interactional synchrony and a sense of mutual understanding. In Tanaka's account we find that intercorporeality is based much more on visual excitation than on touch. It therefore seems that gestures, as a point of 'contact' between individuals, may play an important role in conceptualizing virtual space. As regards gestures, Merleay-Ponty suggests that

> "The communication or comprehension of gestures comes about through the reciprocity of my intentions and the gestures of others, of my gestures and the intentions discernible in the conduct of other people. It is as if the other person's inhabited my body and mine his." (Merleau-Ponty, 1962: 185f).

Gestures are not just isolated movements, in other words, but rather a part of a community of flow wherein intercorporeality may be achieved (in either the agreement or rejection of the gesture) even across a distance (whether by physical in-person means or virtually). Not just volitional and subjective intent is expressed in such gesturing, but we rather see sense-making occur as part of a broader social context – therefore, a gesture is a social act and does not merely relate to one's own point zero.

The role that gestures and gesturing plays in digital communication technologies thus seems crucial for making sense of online teaching. In this regard, Heath and Luff (1991) describe the role of gestures in their insightful work on videoconferencing in an office environment. They argue that

> "Despite having the facility to witness a co-participants visual conduct (...) many actions, which are performed non-verbally, do not achieve sequential performative significance in the interaction. In particular, gestures (...), which are systematically employed in face-to-face communication (...) to organize how the recipient participates, prove in large part ineffectual. For example, a speaker will attempt to produce a description and (...) use gesture to gain a visually attentive recipient. The gesture becomes increasingly exaggerated and meets with no response, the description reveals various linguistic difficulties and it may even be abandoned. Even gestures, which are not (...) concerned with organizing co-participation lose their sequential significance. For example, gestures which illustrate (...) objects (..) referred to in the accompanying talk appear to achieve little communicative significance when performed through video. For some reason (...) the technology transforms the ability of certain forms of conduct to engender action from another." (Heath & Luff, 1991: 40).

The foregoing seems to suggest that the gesture, while indeed playing a role in 'connecting' with the other via screen-based digital technologies, may play a minimal role in expounding intercorporeality in virtual spaces. Certainly, gesturing achieves little when filtered through the technological medium, per the account of Heath and Luff (1991). How then can we explain intercorporeality in the virtual space?

We suggest that one must move beyond a mere account of gestures in describing online teaching and learning, and instead consider gesturing as just one aspect of a broader ontological account of screen-based interaction. What is suggested is not 'disembodied' communication, or an embodiment that is merely related to the observation of gestures, but rather that virtuality suggests a differently embodied intercorporeality. We argue that, to make sense of such an altered intercorporeality, we need to investigate the ontological basis by which embodied individuals engage with the digital technology artefact and with each other.

The virtual as arising in perception

A redeployment of Merleau-Pontian thought in terms of the virtual, and particularly the use of his concept of the flesh (*la chair*), reveals that the body-subject and digital technology artefact are co-implicit in the generation of the virtual. Merleau-Ponty's thinking on how embodied perception shapes our engagement with the world, from his early critiques of objectivism and intellectualism to his postulation of *la chair* (the flesh), conceptualizes the body-subject as an integrated surface of engagement with the world. For Merleau-Ponty, the world is already there as an inalienable presence before reflection begins; and phenomenology serves to give philosophical status to the direct description of one's experience through the "direct and primitive contact" of the individual with the world (through her embodiment) (Merleau-Ponty, 2002: vii).[10] It is through phenomenological description that one "[re-achieves] a direct and primitive contact with the world" (Merleau-Ponty, 2002: vii).

Perception is the individual's entire bodily inhabiting of its environment, and it is this theme that is central to Merleau-Ponty's thought. He argues that perception is perspectival and finite from the body (Merleau-Ponty, 2002: 81), that through perception the individual is absorbed within and directed towards objects within the world, 'forgetting' the essence of consciousness in perception (Merleau-Ponty, 2002: 67, Merleau-Ponty, 1968: 213,), and finally that this sensual perceptual experience of the world extends to a perspectival structure of all human experience and understanding (in *The Visible and the Invisible*) (Carman, 2008: 1–3).

Sensing may therefore be understood as the concomitance of the body with the world in the form of a reciprocal exchange. Merleau-Ponty argues that

> "a sensible that is about to be sensed poses to my body a sort of confused problem. I must find the attitude that will provide it with the means to become determinate … I must find the response to a poorly formulated question . And yet I only do this in response to its solicitation … . The sensible gives back to me what I had lent to it, but I received it from the sensible in the first place." (Merleau-Ponty, 2002: 222).

Such a concomitance is representative of an intentionality that is finely attuned with the sensible thing – both the perceiving body and the perceived thing form an active and reciprocal part of the intertwined circuit of sensibility. In other words, the sensible thing calls forth to the body to partake in of a perceptual attitude that will lead to the sensible thing's disclosure. The perceiving individual represents the pre-reflective and anonymous subjectivity of the body, which remains enmeshed in the world that is being perceived as perception takes place.

The embodied facticity of the individual suggests that the virtual may be understood from the perspective of the body-subject as experiencer of the virtual. Furthermore, the notion of the flesh provides a means to understanding the individual's experience of the virtual. The flesh builds upon Merleau-Ponty's description of the unity of the senses and refers to the entirety of sensed things with which the body forms a continuous surface, through the concurrent crossing of the body-subject to the world and the body-subject's simultaneous intertwining with the world. The flesh is "the underlying ontological foundation of sensory receptivity and motor spontaneity" (Carman, 2008: 123). It is 'on' or 'through' this surface that the crossing to and from the world (in its fullest sense) takes place – rather than the individual just being in the world, the flesh positions the individual as of the world (Carman, 2008: 123), including thus the virtual one. There is a tight intertwined unity of consciousness and the physical in

[10] Merleau-Ponty set out to emplace the origin of both the individual, perception and the natural theoretical attitude in embodiment following Husserl's inquiry into the life-world (*Lebenswelt*) as the predicative sphere of 'praxis' (Carr, 1967: 373, 374). Merleau-Ponty took up the life-world, or in his nomenclature, the lived world (*monde vécu*), as the intentional object of experience, while perception was the activity through which this object is constituted by the embodied individual (De Waelhens, 1951: 92). Perception occurs not as an isolated psychological activity 'in' the world; perception is for Merleau-Ponty the Husserlian 'origin' of the world, that towards which one is turned in experience.

Merleau-Ponty's description of flesh, whereby consciousness is a characteristic of the lived world (it is not separated from it), and perception (through the flesh) gives access to this unity of subject-object (the intertwined relation between consciousness and world).

Indeed, if we take Merleau-Ponty's phenomenology of embodiment and his postulation of the flesh seriously, virtuality could only arise as emergent characteristic of this circuit between body-subject and digital artefact. The virtual enmeshes and encompasses the body-subject to such a degree that engagement with the self, the world and the other is actively and continuously affected. We therefore argue that the virtual serves as a point of networked intersubjectivity that concretely expands and constrains human experience and behaviour.

Reified virtuality

Understanding the virtual as an emergent characteristic in the relation between the embodied individual and the digital technology artefact provides a crucial avenue for explaining how the individual's embodied sense-making of the self, the other, and the world is challenged and altered through one's encounter with the digital technology artefact. Hereby, the flesh (as ontological concept) is descriptive of the matrix of intertwined and reciprocal relations serving as the foundation of the body's relational engagement with the technological artefact from which the virtual arises.

A Merleau-Pontian account of virtuality, again understood as ontological through the flesh, has crucial implications for how we can describe the world as 'constructed' by means of digital technologies. We may thus posit that in the virtual we navigate a reified landscape. Virtual reification, though seemingly a contradiction, sees us treating the virtual as concrete from the basis of our embodiment. This reification takes place not only from the zero-point of the sole individual, but as part of a broader intersubjective engagement with others and with a range of technological artefacts. Indeed, in industrialized societies we find that the multiplicity of virtual encounters by the individual is expanded to the nth degree through continual engagement with a variety of different digital technological artefacts.

Virtuality is conceptually more broad than the individual's engagement with a single digital technology artefact because virtual space is generated in the encounter of the individual with more than a single digital technology artefact over a period of time. Modern society is typified by a 'symphony' of virtuality, a variety of digital technology artefacts functioning in tandem to create our virtuality-enmeshed world. There is an immersion of the individual within the overwhelming and continual stimulus of digital technology artefacts; the individual is 'surrounded' by the phenomenon of virtuality. This relates, firstly, to the sheer mass of digital screen-based technological artefacts that the contemporary individual encounters throughout their day. Secondly, such a 'surrounding' of the individual by digital technology artefacts affects the individual's behavioural project (habitude). For example, the contemporary user of a smart phone is generally spatially near their phone, and when they are not within reach of the device their expectations are still shaped around it (one may feel 'disconnected' from others, or may 'imagine' that one's phone rings) due to the perceptual and experiential characteristics of said device having become a part of the individual's behavioural project (habitude).

Furthermore, beyond artefactual engagement, we find that the virtual arises in the realm of an intersubjective interplay – between agents that are both other embodied individuals and also artificially intelligent. For the purposes of the current study we shall only be focusing on the former, i.e. those other embodied individuals that we recognize as similarly human to trace intersubjectivity in the virtual. Such intersubjectivity is a useful tool to explain how alienation, as reported by both students and lecturers in online learning, may come about.

Alienating and delimited virtuality

The virtual, understood as a reified landscape, leads us to consider the possibility of an alienated networked intersubjectivity, whereby all potentialities are founded in ordered and carefully arranged systems that promulgate pragmatic and capitalist logics. Merleau-Ponty recognizes the political aspects of alienation when he argues that

> "The proletariat is universal de facto, or manifestly in its very condition of life…. [I]t is the sole authentic intersubjectivity because it alone lives simultaneously the separation and union of individuals" (Merleau-Ponty, 1969: 116–17).

Insofar as the virtual is an intersubjective space, so we may also suggest that it functions as a space for alienation. The link between intersubjectivity and alienation is also reflected in the work of Enzo Paci, who argues that alienation is an intersubjective experience. In trying to think about the political relationship that exists between alienation and technology from this type of phenomenological perspective, we find that Adorno provides a (uniquely embodied) account of alienation when he suggests that

> "Everything is to be at the service of the hand that grasps it, but the grasping hand regresses to the repetition of what is available, which is not actually that at all." (Adorno, 1997: 281).

Adorno's statement suggests alienation along the same practical lines that Merleau-Ponty sketches in embodiment (i.e. when he says that the body allows one to 'get a grip' on the world). Tool usage (such as the use of contemporary forms of digital technology) and the 'grasping hand' as instrumental perspective suggests a functioning in a reified landscape that utilizes only what is available (or provided by capitalism).

Such a consideration of 'what is available' has several important facets in considering the virtual. Firstly, if we assume that our lived world is 'acquired' by perceptual means (and through the technological medium which both enables and is part of the perception), then we must recognize also that a form of sensory delimitation occurs in the virtual (Swer & Du Toit, 2021). The use of screen-based technologies is centred on the visual and auditory, while remaining ignorant of the full sensorium of embodied experience (in terms of touch, proprioception, spatial awareness, and so on). Such a delimited virtuality entails a deficient ontological shaping of individuals' perception of the world on a mass societal scale.

Secondly, in recognizing technology as such a delimited experiential 'means to an end', we cannot ignore that the contemporary human being functions under the auspices of capitalism (or rather, a kind of techno-capitalism). Indeed, merely viewing technology as a means to an end often leaves capitalistic societal structures outside our consideration. A recognition of the capitalist agendas that underlie contemporary technologies is essential for countering the reduction or regression of behavioural and embodied possibilities of the body-subject in virtuality to dull, repetitive, productive actions (we see also this danger arising in online teaching). There is a danger, following on from Adorno's thinking, that the virtual may increasingly become typified by a deficient hand and a reduced practice.

Online teaching and alienation

As regards the online learning experience during the pandemic, we argue that students feel 'disconnected' from the lecturer and class content due to their engagement through such an alienating and delimited virtuality (see also Swer & Du Toit, 2021).[11] What students are confronted with is the experience of the systematization of underlying structures that reflect the neoliberal ordering and priorities of the modern capitalist university education in its purest form.

While the virtual is delimited, we suggest that the student is not really receiving a deficient form of university education (keeping outside the present discussion the inherent underlying delimitations of such technologies). Instead, what students are receiving is the mainlining of neoliberal capitalist education – a form of education whereby students are expected to act as information processors and whereby lecturer involvement is stripped of everything other than the most reproducible elements. Lecturers become little more than 'content parrots'.[12] Such a state of affairs has two effects: Firstly, what the students are encountering is a 'minimal' lecturer (i.e. a lecturer that is misrecognized in terms of their embodied subjectivity); the lecturer acts as little more than a content deliverer. Secondly, the student is confronted by the actual practicalities of the capitalist work world through their university education, whereby they absorb minimal knowledge and are rendered mere consumers of knowledge geared to enter the global work force.

[11] Importantly, this critique relates mainly to the so-called 'emergency online teaching' that has popped up in various universities as a result of the unexpected onset of the current pandemic.

[12] Lecturers also don't own the content they themselves are creating. University management could repeat the lectures created during the pandemic until the lecturers themselves have died (and beyond) with little involvement of the lecturers from the point of creation onwards (we also recognize that some American universities are already doing this).

Students are therefore required to refine the knowledge they have gained (to rework it along fairly low-level, well laid out assembly line instructions) and to then reproduce and regurgitate such knowledge along the lines of a quantifiable scoring of marks and progress through the system. There is very little opportunity to develop a relationship with the lecturer or with fellow students, and thus the virtual can only provide an environment that is already set up to foster alienation. What such students are encountering in the online space is the pure (or purified) structure of the modern capitalist university, stripped of all the Medieval and Neo-Medieval trimmings that make a university education bearable and justifiable to both staff and students. Problematically, students come face to face with a reified manifestation of capitalist education that has as its goal the preparation of students for the capitalist work-world while misrecognizing the broader scholarly goals of the institution itself.

Therefore, student alienation (which we have introduced from a Merleau-Pontian perspective) is the inevitable experiential consequence of deficient virtual embodiment through praxis. Taking inspiration from Adorno (as cited above), we may argue that everything appears through the virtual as reified objects to be manipulated by the hand. Importantly though, in this case the virtual hand is deficient – it is less than – it is a withering that entails deficient practices.

One may object that, from the student's point of view, they are indeed engaged in and participating in an intellectual activity. We recognize this point while at the same time also noting that the nature and contours of such activity as deficient. While one may argue that, to a minimal degree, the alienation encountered in the virtual is a by-product of the system qua system (of technological artefacts) as an inevitable consequence of engaging with a virtual world (Swer & Du Toit, 2021), we suggest that the nature of engagement with knowledge by the student as part of the 'optimized' and 'streamlined' neoliberal university machinery during online teaching underlies a much broader and encompassing alienation of the student – an alienation that impacts their capacity to engage with study material in the online environment, and that negatively shapes their awareness of themselves as a learner. This is a direct consequence of the specific capitalist ordering of the virtual learning environment, and we suggest that the lecturer should be cautious of such problematics when the neoliberal university (as an institution) may come to utilize students' experience of online alienation as a point of entry for the promulgation of contemporary capitalistic thinking rather than fostering critical analysis and scholarly engagement.

Video feedback

We next consider a strategy to counter – to an extent – the alienation described in the foregoing section. A relatively novel strategy that has been employed by Swer in his courses has been the abandonment of providing written feedback on essays to students, instead opting to deliver asynchronous video feedback on all undergraduate essays (for a first year course). Based on his end of course analysis, Swer concluded that student response to the video feedback was incredibly positive – fantastically so. The overwhelmingly positive student response to a relatively novel form of feedback indicates that, through utilizing technologies in online teaching in contra-capitalist fashion, the lecturer may succeed in 'reconnecting' those once 'disconnecting' students.

We posit that video feedback engenders an enhancement of an interpersonal connection, rather than a further distancing. While the student often feels neglected during online classes (and also in large groups), video feedback on essays allows face-to-face contact time with the students: Detailed feedback may be provided, a supportive tone of voice may be used by the lecturer, supportive facial expressions may be seen, and sympathetic gestures may be made through such one-to-one feedback opportunities. The true importance of video feedback lies in the fact that it is a technique that employs various forms of technological media, while negating problematic forms of capitalist productive processes engendered by mass feedback systems and automated marking.

Naturally, the allotment of video feedback time by the lecturer is supplemented by course lectures, and therefore students are provided with the chance to both watch class lectures and receive personal interaction. Video feedback engenders a sense of community, and the personalized feedback provided to the student allows them to see the lecture anew because the lecturer is talking closely to, and dealing specifically with, their own work in a manner that may have been unfeasible in in-person contact sessions and traditional lecturer-student setups.

Conclusion

It has been argued that virtual space is found in neither the digital technology artefact alone, nor in the individual as embodied being alone. Rather, virtual space arises as that 'between' in the relationship between the digital technology artefact and the embodied individual. By means of virtual space the individual's perception and

behaviour are emergently altered, foundationally affecting the individual's sense-making of the self, the world and the other. Such emergent alteration of the individual's perception and behaviour, rather than being tangential to virtual space, must be essentially accounted for to allow a foundational, encompassing and multimodal description of the embodied individual's functioning and emplacedness in contemporary society. The virtual is typified by the ontological – it is an intersubjective and reified space.

Since reification makes up the virtual, our engagement with the virtual points us back to the possibility of a virtual alienation (indeed, for Marx, alienation is an intersubjective social relation). We argue that we find in the virtual not isolation, but rather a deficient mode of intersubjectivity. While the individual never becomes atomized, for such a deficient mode of intersubjectivity remains nevertheless a mode of intersubjectivity, we find that the individual functions as part of a deficient and distorted network.

A central problem here, which we have highlighted in investigating the alienation of students in online teaching, is that the contemporary capitalist system and the neoliberal university is mainlined in such forms of online education. While we do not consider all forms of online teaching problematic, we do suggest that careful notice should be taken of the interplay between student's experience of online alienation and neoliberal agendas in the university – especially since this relation has come to the forefront due to the complete online pivot caused by the Covid-19 pandemic. We suggest in conclusion certain teaching methods that may minimize or mitigate students' experience of alienation and which may therefore counter such capitalist agendas.

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Re-presencing the digital trace in networked learning design

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Abstract

Recent work in and on networked learning outlines the value in taking a relational view of complex assemblages of people and things such that, for example, non-human entities can be both/either learner and/or teacher. The sociomaterialist perspective brings questions of how power remains continuous yet transformed when the social reach of digital technology is accelerating towards a "tipping point" (Schwab & Malleret 2020). This paper will continue the Freirean work of e-quality set out by networked learning's founders through a transdisciplinary pattern-design learning approach capable of reflexively tracing macro-level technological, scientific, and social constructs and micro-level experience. This will be elaborated through phenomenological hermeneutic design imitative of how we generate or are traced and influenced by digital traces, seeking to 're-presence' (cf. van Loon in Johnson 2020) the digital trace as it plays out across extended systems while making care-ful use of the digital tool. Theory will draw on Ricoeur's work on the trace and Stiegler's concept of the recorded mark. Models of how to re-presence and leave further traces in technology enhanced networked learning design will draw on emergent co-creative knowledge networks also employing care-fully chosen digital tools, including Stiegler's hermeneutic web, community wikis, and digital gardens with the goal to augment that which is "valued in the rest of life" (Goodyear & Retalis 2010).

Keywords

Design thinking, epistemic fluency, systems theory, free software, digital gardening, permacomputing

Networked learning design for the technosocial "tipping point"

Technology-enhanced educational design is not new but it may feel new at a time the World Economic Forum (WEF) has dubbed a "tipping point" in its 2020 report (Schwab & Malleret 2020) which describes how the deterministic world is giving way to a highly interconnected "quantum world". This tipping point, characterized by the increased reach of digital technology (p. 11), is anticipated to accelerate "at alarming speed" (p.26). But despite growing awareness of the urgency of the technosocial problem, no one can agree what the domain of "science, technology and society" even means, if it exists at all, to paraphrase Bruno Latour (1987, p. 16). Work in networked learning that engages the artefacts of multiple knowledge domains (e.g. Marheineke 2016, Fawns 2019) suggests that the design of learning environments can afford to explore this problem while furnishing appropriate tools and artefacts without necessarily being "impossibly complex" (Goodyear, P., Carvalho, L., Dohn, N. 2016, p. 107). Building on that work, this paper will explore Freirean networked course design that is capable of taking a critical approach to the interrelation and management of digital tools, artefacts, and people (Koole and Gulson in Gourlay, L., Rodríguez-Illera, J.L. et al. 2021). This will be achieved through a design pattern learning approach which has a history of transdisciplinary applications (Alexander 1977, Gabriel 1996, Goodyear & Retalis 2010) and illuminates the epistemic potential of the network (Goodyear, Carvalho, Dohn 2016). This design approach can be re-presented in course sub-units to illustrate how tools, artefacts, and people 'play out' – both historically and in the digital knowledge system or cybernetic networks that we are born into today. The traces of networked knowledge systems that are externalized through the tool and the significance and heuristic value of the passage of our existence in our attempt to interpret these "traces" (Ricoeur 1988) are central to the design pattern learning approach presented here. Ricoeur's "trace" will be compared with Stiegler's (2018) concern with the traces of record-keeping mechanisms that are – historically – external to individuals (as exosomatic hypomnesic tertiary retention). The purpose of focusing on the trace is not only to reflect on "authorised" domain knowledge or to include "alien" perspectives from the past (Ricoeur 1988) in order to better understand the present. It is also to consider how to give students experience in re-presencing (van Loon in Johnson 2020) digital traces such that this includes critical analysis of (digital) knowledge tools while using them to manage and co-create

sustainable knowledge systems. Such experience has the potential to promote reflective, actionable decision-making and that which "is most deeply valued in the rest of life" (Goodyear & Retalis 2010, p. 19).

This paper is concerned with the recent attention given to the interrelationship of artefacts, people, tasks, activities, and outcomes, in which non-human agents are understood as learners or teachers with implications in sociocultural, political life (Koole in Gourlay, L., Rodríguez-Illera, J.L. et al. 2021; Goodyear, P., Carvalho, L., Dohn, N. 2016; Markauskaite & Goodyear 2017). Theoretical support for an interrelational approach includes sociomaterialist perspectives (cf. Goodyear, P., Carvalho, L., Dohn, N. 2016, p. 95) such as Actor Networked Theory (Latour 1987), which understands science to be produced through a network in which agents are not just people but also artefacts. Another example is Bernard Stiegler's organology (2018), which is a conjoined analysis of the history and future of physiological, social, and artificial organs. Stiegler's work on organology with Ars Industrialis identifies the trend in neoliberalism to replace social organizations and institutions with technological services which serve a completely speculative economy. Hyper-maladjustment results as the artificial organs constituting the technical system short-circuit psychosomatic and social organizations (Petit 2013). This will be unpacked below in the discussion of 24/7 capitalism though it already suggests the psychic and social significance of technological tools and suggests that careful consideration be made of the tools chosen in course design. Further, given the trend of technology companies to become involved in governance and educational policy networks, "power topologies" are also relevant topics in networked learning (Gulson in Gourlay, L., Rodríguez-Illera, J.L. et al. 2021, p. 340; cf. Fawns 2019, p. 137).

The social imbalance effected through technology has been observed by programmers themselves (e.g. Norvig 2021). Even the WEF 2020 report notes the risk of dystopia as any digital experience can be turned into a "product" designed to monitor and anticipate our behaviour (Schwab & Malleret 2020, p.127).

Inter- and transdisciplinary perspectives are needed at a time when large-scale technological development is to combine hardware, software, biology (cyber-physical systems), and machine-to-machine communication. That and the internet of things (IoT) are integrated not only to increase the automation begun in industrialization but to improve the self-automation of machines capable of diagnosing issues and "predict[ing] our cultural interests" (Schwab & Malleret 2020, pp. 68-9). This can take place through dark patterns that coerce, manipulate, and deceive (Zuboff 2019). These patterns have the potential to lead to social injustice (O'Neil 2016).

One cannot easily avoid being exposed to such influences due to what Cory Doctorow (2021) explains as network effects, switching costs, and interoperability: people remain on software applications (apps) because their friends or colleagues are there. Furthermore, these apps block communication with contacts in other walled gardens, which is to say with other software services that also function as closed ecosystems. Additionally, it can be difficult to download or control material once it has been uploaded to an app or Service as a Software Substitute (SaaSS). Personal computing can be at the mercy of the software providers or service operators, who are also likely to be spying on us (Stallman 2021). Stiegler (2018) posits that the 24/7 digital panopticon of capitalism impedes our ability to dream, want, reflect, and decide by automatically generating a neoliberal technological vision of the future that is ultimately a "*systemic impediment to thinking*" (p. 46). Stiegler (2014a) notes that we are consequently permitted only to consume pre-fabricated symbols, not to contribute to their production (p. 78).

If the above illustrations are already familiar, it is worth asking why, if we know all of this, we permit the use of spyware in the design of our learning environments. One example is the ubiquity of Zoom, which warranted the negative attention of cybersecurity expert Bruce Schneier (2020). Recognition of this problem illustrates the importance of an approach to learning design that improves "design performance while also educating the designer" (Goodyear & Retalis 2010, p. 4) through critical analysis of the digital tools being used. But even education designers who have taken the extra step to maintain full control of the data that they upload, such as by designing their own learning or content management systems (LMS, CMS), are not guaranteed to be free of these problems unless they are able to host the software they use themselves, which comes with a variety of security problems, such as bots designed to attack smaller servers. The alternative, to seek a professional web hosting service, is problematic because many such services also sell (or "share") user data. This is to say that knowledge of users is collected through spying and not made transparent to users. This can be understood as an imbalance.

Networked learning is positioned to address this imbalance due to its roots in Freirean pedagogy. In the update to the Networked Learning Manifesto (Beaty et al. 2002), the authors note the importance of engaging not just with others but "one's position in the world". Networked learning takes a view that "demands both the nature of the knowledge being developed and identities constructed". It supports "e-quality of opportunity", which is to say the

opportunity to co-create knowledge through participatory relational dialogue and critical reflexivity (Beaty et al. 2002). A problem today is that data is being mined from us 24/7 in order to be used to make decisions about us. We are not able to contribute to how it is interpreted nor are we consciously creating it.

Freire writes that every age produces new forms of concealment and bondage and that people will be carried along in the wake of change if they fail to critically perceive what is significant. This can happen if they are unable to use their capacity for reflection to provoke transformative action or self-actionability (cf. Freire 2005a, p.6). This can be illustrated by developing an example from above. Education designers may feel they have freedom of choice over the software they use, but this is illusory where the software is a pre-fabricated service that reduces control over personal computing while spying on users (Stallman 2021). Only free software guarantees user freedom to run, study, and change the software as well as redistribute copies with or without changes (Stallman 2002, p. 121). Freire's work on power and oppression remains relevant. Its place in networked learning demonstrates continuity in the experience that has accumulated in the field albeit through new iterations and formulations on the "surface of change" (cf. Goodyear & Retalis 2010, p. 1), such as any responses to the changing power topologies described above. In Freirean terms (2005b), we ask what types of mutism software services can produce and how, by contrast, to promote "generative themes" in the way students "think about and face the world" (p. 106).

Networked learning engages "heterogeneous digital tools and resources, used in ways that interweave with the other activities of life". These include the "'messy realities' (Selwyn 2010, p. 70) of technology-related practice" (Fawns 2019, p.138). As such, networked learning supports the iterative design of learning environments while furnishing critically-analysed tools and artefacts. A case in point central to this paper is how networked learning has adopted a pattern design approach introduced by architect and design theorist Christopher Alexander (1977) that is also popular among computer scientists (Lea 1994; Gabriel 1996).

The overlapping interest in pattern design thinking that is shared by computer science and networked learning is fruitful on multiple levels. First, it suggests the epistemic potential of networks as design patterns, a capacity that will be returned to in the section on the trace. Learning networks can be patterns because "coherence among the activities helps resolve the learning agenda of the network … As Jones (2004) has pointed out, calling something a network can be seen as bringing the network into being" (Goodyear, Carvalho, Dohn 2016: 93). The strength of the metaphor can be very powerful: "Seeing something as a network necessarily focuses on node-link structures, foregrounding connectivity and topology and backgrounding such things as spatial relations" (Goodyear, Carvalho, Dohn 2016, p. 94). The significance of the metaphor only increases if understood by way of the hermeneutic circle and comprehension of the mimetic disclosure of the world.

The network, as a created, emergent metaphor – or disclosure of the world, requires its 'readers' to actively construct the means by which to receive it (Ricoeur 1991a, pp. 311-12). The explanation and interpretation required in comprehension assist in the appropriation of any distant "alien" concepts (Ricoeur, 1991b, p. 60). The new perspective that emerges through this process gives a person a new capacity to know themselves (Ricoeur 1991a, p. 316). After all, that which is re-presented, through mimesis, is referential of a world that is already there. But mimesis is not just an expression of a world that is already there; it is also a fabrication, construction, creation – as are interpretations of traces when limited to a single moment and place in time. The appeal of Alexander's work is that it centres on patterns of disclosure to the world that are creations unto themselves (Gabriel 1996, p. 93), with an eye for pattern design solutions that are almost mystical in nature (Gabriel 1996).

According to Alexander (1977), pattern design solutions are understood on the micro- and macro-level. On the micro-level (e.g. building a house, or a porch) they involve a specific solution that blends artefact and method together (e.g. "Make small places at the edge of any common room … 6 feet wide and 3 to 6 feet deep" in Goodyear & Retalis 2010, p. 15). An illustration of the macro-level is to view all of the patterns together. For Peter Goodyear and Symeon Retalis (2010), this potentially confusing approach is nevertheless helpful by bringing indefinite extensibility to situations like "creating a new course, or moving a course from face-to-face to blended mode" (p. 17). Goodyear and Retalis consider the value of applying a patterns-based approach to education to lie in the possibility to reuse them in myriad contexts in myriad ways. They note that Alexander's pattern design thinking is explicitly critical of the outcomes of "mechanical" design that squashes and erodes those things that make us human and conclude that:

> *good* TEL [technology-enhanced learning] design is characterized by a commitment to helping people create circumstances in which learning can be experienced as coherent with what is most

> deeply valued in the rest of life, as a source of pleasure, growth and transformation. (Goodyear & Retalis 2010, p. 19).

This architecturally-inspired approach to TEL illustrates how epistemic constructs can be meaningfully coordinated across knowledge domains as examples of epistemic fluency (Markauskaite & Goodyear 2017, p. 604). This is also illustrated by Richard P. Gabriel's (1996) popularization of Alexander's approach among programmers in a book chapter that had begun as an article entitled "The Bead Game, Rugs, and Beauty". The work references Herman Hesse's novel exploring the pursuit of the synthesis of all knowledge domains. The focus of the article compares Alexander's (1993) work on Turkish carpets with object-oriented systems in programming. Gabriel (1996) writes that "The goal is to build a system which is necessarily made up of other systems" (pp. 94-5). Like in TEL, the advantage of a design pattern approach is the potential for customization and specialization while allowing for reuse. Gabriel describes this potential as a framework: "A *framework* is a system that can be customized, specialized, or extended to provide more specific, more appropriate, or slightly different capabilities" (p. 95).

The use of design patterns in both TEL and programming can itself be visualized as "node-link structures, foregrounding connectivity and topology and backgrounding such things as spatial relations" (Goodyear, Carvalho, Dohn 2016, p. 94). It also effectively uses Alexander's pattern-based approach as a boundary artefact, which, to draw on a work by Marc Marheineke (2016), brings "common ground" to the perspectives of various knowledge domains by crossing boundaries while conveying meaning (p. 82). Boundary artefacts are useful to "innovation communities" which are "characterized by different knowledge domains and special requirements for knowledge transformation" (p.110). Where "sense-making in innovation communities requires aligning mutual mental models and group cognition", innovation communities "must build upon a 'common ground' (Clark, 1996)". This is "established when actors use a joint language," and is "formed with boundary objects into a new, shared ground. … This means members of a community know (implicitly) that they agree upon a set of beliefs" (p. 111).

Common grounding has traces in earlier work in networked learning which mentions the importance of "generic competences", described as the skills employers increasingly seek from employees. These include "literacy, numeracy, communication, foreign language, leadership, teamworking and IT skills" – skills noted to be key to innovation (Goodyear 2001, p. 61). The WEF promotes similar "21st century skills" (Soffel 2016). These require literacy in multiple knowledge domains and can be described in terms of epistemic fluency, which involves "juxtaposing tools and practices and jointly inhabiting a material environment" (Goodwin 2005 cited in Markauskate and Goodyear 2017, p. 61) and "blending" different ways of knowing (Markauskaite and Goodyear 2017, pp. 306–7). Employers value innovation over specialized knowledge which can quickly become obsolete (Goodyear 2001, p. 61).

Course design which seeks to develop context-sensitive blending is also "good" design as it develops the types of skills that can be used to solve the complex sociocultural problems defined as wicked for being ill-defined and extremely tricky to design for (Rittel & Webber 1973). The WEF acknowledges such problems as central to the "great reset", which is "complex, adaptive, fast-paced, and ambiguous" and cannot be understood in linear terms (Schwab & Malleret 2020, p. 18). Course design which integrates blending is "good" because it can function to represent, through mimesis, networks of intersecting knowledge domains as a topic, framework, and experience of course design. This approach has the potential to intensify, magnify and transfigure the signification (Ricoeur 1991a, p. 140) of networks by encouraging participants to face them (cf. Freire 2005b, p. 106) as critics, explainers, interpreters, assemblers, editors, consci(enti)ous tool-users, and creators.

Re-presencing traces

Ricoeur (1988) is interested in the causal relations involved in the series of operations that comprise the passing by of people while they are alive and their particular passing that results in a particular material mark (p. 120).

To follow a trace is to be concerned with its datability while also retracing its trajectory in space over a lapse of successive time (despite whether the trajectory was that linear); to reason by means of causality about the chain of operations constitutive of the action of passing by (p. 120). It is also to be concerned with its public time, apparent to everyone (p.124). To move from the mark (or artefact) to the thing that made it is to isolate the significance of the causal relation of vestige to passage (p.128). Following a trace means effacing the self before the trace – even though such absorption does not exhaust the relations of successive time between the trace, what it left behind,

and the mark in the "here and now" (p. 124). Therefore, to re-presence a trace in the always ongoing present is to allow for new connections, new readings, and new interpretations to be made about the significance of "passing by". This "endless work of distancing and renewing our historical substance" is never finished but must be carried on "with patience" (Ricoeur 1991b, p. 269).

The term re-presence is based on Joost van Loon's (2007) exploration of the problem of representation in ethnography. He asks whether the ethnographer can ever accurately represent their subjects in writing and whether writing can ever adequately represent what is happening (p. 280). Representation is defined as a social and symbolic relationship which "speaks for" – and is "associated with 'speaking for', as in political representation" where a delegate takes the place of a larger collective, "returning [it] to presence" (p. 279). In this respect, it correlates with the problem of power topologies and big data mentioned earlier. Mike Johnson's (2020) consideration of Van Loon's "re-presencing" questions the possibility of garnering more "direct [ethnographic] accounts" through digital technology, specifically mobilage, but also meditates upon the problem of the potential lack of analysis in raw information.

Similarly, Ricoeur (1988) considers the problem of how a trace such as a document needs to be "authorised" by an institution such as the archive, which is where a document is deposited (p. 117) and which ultimately produces, gathers, and conserves the trace. While the ideology of the archive is not above criticism, the "authorisation" that it represents is significant. What we think of as being "authorised" domain knowledge is important to consider when we are dealing with digital traces and networks – which include raw information.

Ricoeur identifies the problem of the work of data banks, computers and information theory where their data is no longer accountable to the dead or "to people of flesh and blood to whom something really happened in the past" (p. 118). Cut off from the significance of the document's function as a trace left by the past, "the datum becomes truly insignificant" (p. 118). While the scientific use of computer data leads to a new kind of research, "this activity constitutes only a long methodological detour destined to lead to an enlargement of our collective memory in its encounter with the monopoly exercised over speech by the powerful and the clerisy" (pp. 118-9). For history, Ricoeur observes, has always been a critique of social narratives and, as such, serves as "a rectification of common memory" (p. 119). Therefore, from a Freirean pedagogical perspective, the pursuit of the trace is of social significance.

The importance of understanding the "mark" of the trace as the sign of a "human activity" is illustrated by the digital knowledge domain (cf. Naur 1992), where one of the problems of legacy software lies in the tacit knowledge possessed by individual or groups of programmers. This means that the concepts that shaped the trace may no longer be available or comprehensible when the people who created it are no more (e.g. Naur 1985). For this reason, Alistair Cockburn (2002) recommends that systems designers use good, or even multiple, metaphors in the documentation in order to "help the next programmer build an adequate theory of the program". The easier it is for a design team to guess about the structure of the software based on the metaphor(s), "the greater the resulting consistency in the final system design" (pp. 239-40).

This is a good description of Ricoeur's (1988) "double allegiance of the trace" (p.120). On the one hand, it involves the empirical, causal "chain of operations constitutive of action of passing by". This takes place in ordinary, universal time. On the other hand, "to return from the mark to the thing that made it", which is to say from the software system design to the existential mental model that created it, "is to isolate, among all the possible causal chains, the ones that also carry the significance belonging to the relationship of the vestige to the passage" (pp. 120-125). This takes place in phenomenological time.

Through the trace, then, historical narrative can "refigure" time: signifying something without making it appear, forming the intersection that results from the overlap of the existential and empirical (p. 125). The challenge is the phenomenological difficulty of reckoning with time through computations inscribed in ordinary time while following the trajectory of the "sought-for object" that left a trace in geometrical space. The significance of the trace consists in the reference "that requires the quasi-instantaneous synthesis of the print left here and now, and the event that occurred" (p.124).

Naur's (1985) illustration of the need for shared mental models – or shared passages – reveals that Ricoeur's (1988) concern for "the problem of what the trace as such signifies" is not just the work of the sociologist (p. 117) or even of the historian who seeks to understand the marks that are "left behind" (p. 119). It is ultimately the work of the philosopher, able to distinguish signs from traces (p. 126) – which is what big data can be said to be

confusing. Ricoeur, as seen above, considers big data to cut off the significance of the trace by rejecting its accountability "to people of flesh and blood" (p. 118). Stiegler (2018) takes this critique further by pointing to the problem of how big data, through algorithmic governmentality, outstrips and overtakes the subjective role in producing traces by continuously inciting protentions (or anticipations) (p. 46). Further, the "automated production and exploitation of traces, dispossesses us of the possibility of interpreting our retentions and protentions – both psychic and collective." (p. 47). As will be seen, Stiegler argues for the cultivation and practice of a hermeneutic web which opens up multiple traces of passages and possibility. These can be understood in Ricoeur's (1988) terms to phenomenologically trace passages "from the mark to the thing that made it" (p. 128), revealing the complexity of reconstituting "human activities" (Naur 1992). Networked learning through its engagement of the technology actively leaving traces today is positioned to explicitly address these traces and the tools that inscribe them, which are already always a tacit component of teaching.

What is at issue here is the Freirean problem of power, which Ricoeur (1988) portrays as the "monument in the document" and the "scientific use of big data" dissected from the past (p. 118). Who gets to decide the relation between the fabric of everyday life and its re-presencing?

Stiegler's concern over the trace identifies the problem of technology as a substitute for or supplement to human memory (cf. Plato 1925, p. 275), particularly where memory becomes transgenerational through memory-keeping (hypomnesic) tools or apparatuses that are exterior to ourselves (exosomatic). These exteriorize, conserve, express, or transmit memory – and could be said to operate in Ricoeur's "public time". The scope of these technological apparatuses are bigger than ever before due to the global, networked (reticular), and interactive traceability of 24/7 capitalism (Stiegler 2018, p. 47).

How did we get here? Looking at the bigger picture can induce Freirean mutism imposed by the sheer scale of the systems that now increasingly influence and shape our lives. But like in the tale of Hansel and Gretel, filling pockets with traces can lead to treasure. In the post-knowledge age, we cannot afford to not be meta and bring "the network into being" (Jones in Goodyear, Carvalho, Dohn 2016, p. 93). To do so is to continue the work of 'e-quality' in networked learning (Beaty et al. 2002) and to seek to critically analyse design pattern solutions for the meaningful use and management of technological trends and tools. It is also to acknowledge the need for the ongoing critique of social narratives and the rectification of common memory (Ricoeur 1988, p. 119) by encouraging individual fluency with large-scale networks. One way to do this is to not limit imaginative interactivity and engage the "temple" of "authorized" documents as well as the "forum" where explanation and interpretation is exchanged (Caillet 2008, p. 152).

Re-presencing traces in networked learning design

A pedagogy of traces would involve the explicit re-presencing of the contemporary digital marks and vestiges that threaten the Freirean generational capacity. It would also involve the attempted phenomenological (ongoing re-)tracing of their passages and generation of new marks and vestiges. A pedagogy of traces would, theoretically, allow for simultaneous different levels of learning and interpretations.

To trace the problem of digital memory that is external to ourselves (exosomatic digital tertiary retention), "as we are now being traced when we enter terms in a search engine or send messages" (Stiegler in Goetz 2021), networks can be re-presenced in syllabi that at once trace digital traces while creating an environment for the co-creation of new traces through care-fully chosen digital tools. Networked learning design can position itself to imitate and leverage the structure – or pattern-design – of systems to give experience in producing more of what we want and less of that which is undesirable (Meadows 2008, Goodyear & Retalis 2010, p. 19).

One way to introduce the concept of the trace would be to explore its history in a course sub-unit. It could be pointed out that the pursuit to assemble, organize, relate, and possess learning from different domains is not new. Examples range from Aristotelian classification, to *scala praedicamentalis* (3 CE), to Francis Bacon's *arbor scientiae* (1901 [1605]), to the interest Thomas Jefferson took in them. Jefferson sought to apply this classification of knowledge to a college course of study "to effect the greatest possible good" (1854), further raising the question of which sciences may have become "nugatory", or, of little consequence. It was in that same century that what had until then been viewed as a single tree of knowledge became broken up, branch by branch, with no "common problems" (Latour 1987, p. 17); the tools and practices of knowledge domains united no longer (e.g. Snow 1959). The 20th-century attempt to establish communication across disciplines, the Macy Conferences, established cybernetics as a discipline, though practitioners disagreed over its implementation. Kurt Lewin (1948, p. 213) and

Norbert Wiener (1948, p. 25) argued that the most intractable problems are social ones, which need to be dealt with on their own terms. Nevertheless, cybernetics has origins in bioinformation and includes the scientific study of communication and regulation in biological and social systems (Wiener 1948, 1954; Pias 2003 in Umpleby 2017, p. 6). While Wiener did see automatization as a human aid, this was to augment human capacities (1954; also cf. Engelbart 1962). Similarly, while design theorists like Horst Rittel and Christopher Alexander were influenced by cybernetics (Rith & Dubberly 2007, p. 72; Alexander 1964), their approach was decidedly human-centered. Today, the algorithms used to predict, decide on, and project the outcomes of human problems receive much criticism (e.g O'Neil 2016; Pasquale 2016).

If humans are now being traced by digital tools, networked learning sub-units can also trace knowledge tracing and further give experience in leaving knowledge traces, digital or otherwise. How we organize knowledge, both collectively and in our personal knowledge systems, and through which tools, is significant and applicable as explicit subject matter in a variety of knowledge domains.

Experience in tracing knowledge can be achieved by including at least a few sub-units that relate a subject matter to its history and the history of knowledge and tools used to create or store this knowledge, as suggested in the *arbor scientiae* paragraph above. It can also be achieved by trying to appropriate an "alien" historical perspective and re-presence the ephemeral nature of the trace, such as in Naur's (1985) problem. Consideration of the trace can remind us of our temporal passing (as *memento mori*), as it does in Ricoeur (1988, p. 123). This transient perspective makes it easier to include a prompt inquiring into student values and how they envision the values and heuristics required to leave a meaningful trace in the future. Models of exercises in heuristics can be found in Howard Gardner's Good Project (n.d.) but have also been shown to improve student performance (Kross & Guo 2018, p. 6). Of central importance to this paper is how this meta- and macro-knowledge, or inter- and intra-domain knowledge, is used in pedagogical design that seeks to generate "good" configurations among humans (who are symbol and sign-making and reading organisms), technological tools, and activities.

Third-order cybernetics can help clarify the significance of making macro-level pattern design explicit in learning design. Vladimir Lepskiy (2018) defines third-order cybernetics as a transdisciplinary, post-non-classical cybernetics of self-developing, reflexive-active environments, involving subject-meta-subject relations and the humanistic interpretation of philosophical constructivism (p. 33). Tatjana Medvedeva's work shows how this approach can be extended through multidisciplinary relations and systems theory to think through problems like labour relations. Her "extended systems approach" assumes actors are both members and observers of the labour process, so are not just participants adjusting to changes in the environment but are able to re-conceptualize it (2018a). Such an interrelational model of labour relations "depends on employees"' ability to take advantage of new organizational forms – the networked enterprise and culture and their ability to engage in social learning and self-organization (Medvedeva 2018b, p. 280). This requires that workers be "more aware of the whole process in which they are involved", continually modifying or redesigning the process (Medvedeva 2014). Similarly, students can become more aware of the epistemic processes in which they are involved and from which to gain practice in co-producing signification shared through co-individuation (Stiegler 2018, p. 46).

A different systems view that could be used in networked learning as a point of departure for understanding macro- and meta-design is Castellani's seminal complexity map, which explicitly claims it is not complete and invites interaction and improvement (Castellani & Gerrits 2021). Castellani's map is based on Fritjof Capra's *The web of life: A new synthesis of mind and matter* (1996) – a work which has also found applications in third-order cybernetics (Medvedeva 2018a).

The design principle here explicitly invokes macro- and meta-level awareness to encourage synchronous diversity of content and possible paths of interactivity while honouring "authorised" guiding documentation (c.f. Ricoeur 1988, Caillet in Andler & Guerry 2007). It attempts to give students a birds'-eye view of their place in the world, reminding them of the relational skills and tools they need for the collective production of their own traces. The moment students understand that they are navigating their own lives, knowledge becomes dis-automatized (cf. Stiegler 2018) as they are heuristically applying it to their specific case.

The question is whether a course can give experience in the (dialogic) forum and the ("authorised") temple (c.f. Caillet 2008), encouraging students to take responsibility for following their own traces while interconnecting them through common ground and some understanding of meta, macro, and micro level design.

Models re-presencing digital traces in learning design

Networked learning design for the "wicked problems" (Rittel & Webber 1973) of the highly interconnected "quantum world" requires more than charting out the history of the interrelation of knowledge domains especially given the "accelerated" change of the increasingly digital world (Schwab & Malleret 2020, pp. 11, 26). It requires experience not only in the interpretation, annotation, assembly, categorization, sharing, editing, and reconfiguration of those traces but also in leaving new traces. The latter affords experience in establishing common ground, hybrid thinking, and the potential for different interpretations of the same model. This section will consider models that can be implemented in networked learning design that would encourage such an experience of digital traces. These models are: Stiegler's hermeneutic web, digital gardens, and Rekka Bellum and Devine Lu Linvega's permacomputing knowledge building community. They re-presence the digital trace such that it makes co-creative use of the digital tool while critiquing it.

Stiegler's (2018) MOOC, described in part in "The writing screen" (pp. 172-9), was designed to give students experience in co-creating a "hermeneutic web". Students could submit, create, edit commentary on, and engage with the 'gloss' involved in interpretation in hermeneutic work through employing care-fully designed digital tools (p. 173). The goal of this experience was to uphold the good life (pp. 174-5), which aligns with Goodyear and Retalis' (2010) goals for "good" learning design. Stiegler (2018) notes that the digital screen, as a hypomnesic support or tool for tertiary retention – like the cave wall – can reveal as much as it conceals. Nonetheless, it has the potential to make us dream (p. 175). He created social networks that students could use to develop and exchange interpretations, invented a standardized annotation language, and assembled a hermeneutic community comprising members from different knowledge domains (p. 179). Steigler (2014b) elaborates on how students would annotate their course notes by using the graphic language he invented and then transfer them to a digital platform, "enabling the creation of a common space of interpretation and engagement with works, leading to processes of transindividuation" (p. 10).

In the design of Stiegler's hermeneutic web (2014b), an algorithm was used to analyse convergences and divergences as well as similarities and differences to identify discussion points. Social networking software was designed to allow groups to form and debate and consolidate similarities and differences, etc., into collective memory (secondary retentions). Processes of contributory categorization ensued, focusing on the annotated materials. Pre-categorization was hermeneutically related to how the "life of understanding" allows one to understand and be understood as well as reformulate that which is understood in a different analytical form. The algorithm (otherwise described as automatized thinking) was used to serve the social circuit of (exosomatic) knowledge exteriorized in the MOOC. The circuit was contributory by design – designed, above all, to promote a search for meaning that would lead to transindividuation: individuating all the psychic individuals involved (Stiegler 2018, p. 175). "Good" TEL course design brings experience in the significance of individual traces.

Course design seeking to promote such experience can alternatively draw on the practice of digital gardening. This emerged in the 1990s (Caulfield 2015) but is seeing a resurgence as people try to make meaningful connections online and take ownership of their work and tools by sharing and crafting them on their own terms.

Digital gardening is an example of how the web can be experienced as a (garden) topology. This approach encourages visualization of how we – and others – leave traces across the network of the web, such as when we enter search terms or send a message (Stiegler 2018, p. 176). We map out and navigate the externalization of thought in web searches: "things in the Garden don't collapse to a single set of relations or canonical sequence … Every walk through the garden creates new paths, new meanings" (Caulfield 2015). This can be contrasted with Ted Nelson's (1974) Xanadu Project, in which works cannot be quoted without maintaining a connection to the original. Both the project and garden demonstrate a Ricoeurean interest in the trajectories of traces.

Mike Caulfield (2015) writes that approaching digital networks as if they were part of a digital garden allows one to build out "a network of often conflicting information into a web that can generate insights, iterating it, allowing that to grow into something bigger than a single event, a single narrative, or single meaning". The verbs "link, annotate, change, summarize, copy, and share" are very important to the garden, Caulfield writes. Mark Bernstein in his 1998 essay "Hypertext Gardens" further asks: "How can the craft of hypertext invite readers to stay, to explore, and to reflect?" Digital gardening, or the cultivation of personal knowledge systems, can be understood as fertile ground to promote the interpretative and creative skills associated with the trace. Vannever Bush (1945) describes recording (hypomnesic) traces through the use of a machine he invented called the Memex. He describes tying texts together, "building a trail of many items", inserting comments, branching off, and longhand analysis

culminating in “a trail of his interest through the maze of materials available to him”. This can be compared to the design of an annotated participatory hermeneutic web

In digital gardening, the web is a tool for thought (Matuschak & Nielsen 2019) and a tool to think with (Caulfield 2015). The history of this approach can be found in the work of Douglas Engelbart (1962), who saw computing as a way to augment intelligence. An understanding of augmentation can be deepened through a sociomaterialist approach. For example, organological analysis – involving tools and social organization – can be related to the organizational forms of third-order cybernetics described earlier. This would bring awareness of ongoing processes and make potential redesign by participants at once more comprehensible and complex.

“Good” networked learning design can bring experience in using digital tools while reflecting on or critiquing their use. This can be achieved through students creating, interlinking, and commenting on their own critically-assessed digital gardens which in turn link to, annotate, change, etc. “authorised” course material, such as on a wiki-inspired free-software CMS (Goetz 2021). However, a more elaborate wiki model – similarly interlinking a wiki with the forum of a knowledge-building community explicitly using critically-assessed software, but also including so much more, can be found in Bellum and Linvega’s (2006-) “digital playground and personal logging system”. Their wiki, XXIIVV, branches into community dialogue through links to its forum-like Mastadon channel, Merveilles: a “community project aimed at the establishment of new ways of speaking, seeing and organizing information”, but also its webring and associated search engine, Lieu.

The wiki, which is regularly updated and edited, is additionally available as a download. This was formerly hosted on GitHub, which controversially allowed the artificial intelligence tool Copilot to be trained on the code it stored and tracked changes on. The sourcecode was moved to SourceHut. XXIIVV assembles topics and pages as diverse as the End Of Work, Language, Ethics, and Nomadism, questions the need for full colour palettes on web pages given the ubiquity of bloat, and supports going slow and fixing things. The latter can be contrasted with the “velocity”, “alarming speed” “on steroids” anticipated by the WEF (Schwab & Malleret 2020, pp. 3-22). The Solarpunk page considers “sustainability, longevity, and balance with an emphasis on renewable energy” as well as deep ecology, regenerative stability, and permacomputing, drawing on work by Heikkilä (2020) that has been featured on Hacker News and lobste.rs, two popular social news websites on computer science. The Permacomputing page acknowledges the “abundance of digital storage and processing power has caused an explosion in wastefulness, which shows in things like ridiculous hardware requirements for computing even the most trivial tasks”. It asks how to “give computers a meaningful and sustainable place in a human civilization that has a meaningful and sustainable place in the planetary biosphere” – a question relevant to networked learning course designers. Their work demonstrates an awareness of consequences that can affect decision-making, which Stiegler (2018, p. 46) claims to be impeded at present.

Networked learning has never been a proponent of passive learning but the question addressed in this paper is how its design can engage with the dark patterns of contemporary digital design such that students can gain experience in re-presencing digital traces in a “good” way and understand common ground, hybrid thinking, and multiple interpretations and reconfigurations of the transdisciplinary digital trace. This would help in the development of individual and shared skills that could be used to solve the wicked problems (Rittel & Webber 1973) that are characteristic of the sociotechnological “tipping point” (Schwab & Malleret 2020, p. 11).

Conclusion

Large-scale technological development and the accompanying power topologies of technosocial networks threaten to make mute the ongoing work of the critique of social narrative and the rectification of common, now also digital, memory (Schwab & Malleret 2020, Gourlay, L., Rodríguez-Illera, J.L. et al. 2021, Freire 2005b, Ricoeur 1988). But networked learning has experience in the interrelation and management of digital tools, artefacts, people and other activities of life (Fawns 2019) as well as in cultivating the Freirean concern for reflective, participatory e-quality (Beaty et al. 2010). The significance of this pedagogical foundation can be seen in its overlap with socio-technological-scientific approaches involving artificial, physiological, and social organization (Stiegler 2018, Latour 1987), which are capable of addressing the transdiciplinary reach of technological networks and suggestive of further iterations of networked learning design. The networked learning design explored in this paper drew on Christopher Alexander’s (1977) pattern design solutions, which itself has transdisciplinary applications in architecture, software design (Lea 1994; Gabriel 1996), and pedagogy (Goodyear & Retalis 2010). The appeal of pattern design thinking is its applicability and extensibility on both the macro and micro levels. This paper suggests a pattern design approach that re-presences “traces” of the exteriorized record (Stiegler 2018) of digital information

systems like those children are born into today. A focus on traces affords the critique of "authorised" domain knowledge and demonstrates the difficulties involved in reconstituting (Ricoeur 1988, Naur 1985) and re-presencing (van Loon in Johnson 2020) digital traces. By re-presencing is meant returning them to presence in such a way that does not exercise a monopoly over what they mean. This may be contrasted with the trend to use digital technology as a powerful record-keeping tool used to influence behaviour (Zuboff 2019), not accountable to "people of the flesh" (Ricoeur 1988). A macro and meta view of tools that reveals their outcomes, or more experienced heuristics in selecting digital tools for use, can bring new perspectives. The potential for design thinking to generate constructive change was illustrated through third-order cybernetics (Medvedeva 2018), which discourages the vantage point of the passive observer adjusting to change and encourages the vantage point of participants able to progressively re-conceptualize a milieu (Stiegler 2018). Networked learning design can establish common ground (Marheineke 2016), hybrid thinking, and the potential for different interpretations of the digital trace by "blending" different ways of knowing (Markauskaite & Goodyear 2017). This can promote the type of innovation sought in the workplace (Goodyear 2001). Innovative learning design models that conscientiously re-presence digital traces and the tools used to generate them were illustrated through Stiegler's hermeneutic web (2018), digital gardens (Caulfield 2015), and Linvega and Bellum's (2006-) permacomputing, lifestyle, and knowledge-building wiki and community. Such complex assemblages of people, tools, activities, and outcomes model how to think through the "wicked problems" (Rittel & Webber 1973) characteristic of the highly interconnected digital world. They also teach how to safeguard the individuation of all involved and to value that which is valued in the rest of life (Stiegler 2018, Goodyear & Retalis 2010).

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Tomorrow's Networked Posthumans: Reflections on Artificial Intelligence and the Digital Well-Being of Young Children

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Abstract

While networked learning (NL) is most often associated with adult learning and professional work practices, examining the "ontogenetic development" of children in the context of today's smart global networks is also relevant to NL research (Rodríguez-Illera & Barberà in NLEC et al., 2021). In this paper, we ask: What child-technology relations are being forged in our posthuman era of Artificial Intelligence (AI), big data and global networks? We begin by scoping the intensifying presence of networked, smart technologies in the home life of infants, toddlers and preschoolers; we examine recent policy frameworks regarding AI, ethics and children. We then turn to two phenomenological philosophers, Michel Serres and Bernard Stiegler to consider how their thinking about digital technologies might provide insight for parents and educators as they endeavour to make the best "smart" technology choices for children. Finally, we consider the implications of our phenomenological reflections on today's young posthumans for networked learning and postdigital education.

Keywords

Artificial Intelligence, AI Ethics, Early Childhood, Digital Well-Being, Phenomenology, Posthuman, Networked Learning

Introduction

In a recent issue of *Educational Philosophy and Theory* devoted to the oeuvre of French philosopher of technology Bernard Stiegler, Anna Kouppanou (2020) asks, "What is in a child's hand?" Her question aims to expand Stiegler's writings on childhood and specifically what childhood means in the context of his thesis that hominization unfolds via a child's participation with and through their technologized milieu. The human hand, Kouppanou suggests, is the infant's primary entry point into the technical and thus into the human. As the infant explores their sociomaterial world and increasingly tunes into, establishes and refines their prosthetic, co-extensive relations with the "ready-to-hand"—i.e., the available technical objects in their environment—they are simultaneously inaugurating their human being—or better, their posthuman becoming.

What is in a child's hand *today*? Michel Serres (2015), another French philosopher, offers a provocative answer to this question. We will turn to his response shortly. We begin by situating our study of children's early entanglements with digital technologies in networked learning (NL) research. We briefly survey the intensifying presence of networked, smart technologies in the home life of infants, toddlers and preschoolers with a focus on what is ready-to-hand in their lifeworld; we examine recent policy frameworks regarding AI, ethics and children. We then look to Michel Serres and Bernard Stiegler to consider how their differing phenomenological analyses of contemporary child-technology relations might provide insight for parents and educators as they endeavour to make the best "smart" technology choices for children or young posthumans. Finally, we consider the implications of our (post)phenomenological reflections on "what is in a child's hand today?" for networked learning and postdigital education.

Networked Learning, Childhood and Artificial Intelligence

Networked learning (NL) is a field of research more usually associated with *adult* work and learning practices in the context of evolving sociotechnical networks. However, as Rodríguez-Illera and Barberà (in Networked Learning Editorial Collective (NLEC) et al., 2021) recently suggest, NL ought to also consider the "ontogenetic development" of its primary constituents and should thus attend to how today's "tectonic socio-technological changes" (p. 326) may be affecting children and youth. For example, as a child grows up extending their being, thinking and doing with increasingly complex artificially intelligences and neural networks, what habits of mind will prove most productive, most creative, most conducive to learning; what senses of self may be constituted in the deepening imbrications of human-nonhuman intelligences, what reconfigurations of community, of politics, of culture, may unfold? Thus understanding "what [technologies are] in a child's hand today" may provide insight into the work possibilities and learning needs of tomorrow's posthumans who are currently being raised in a churning ocean of intensifying human-AI relational networks.

Background

Infants today are increasingly born into a world equipped with intelligent devices: smart cribs, blankets and change pads, video monitors with night vision and motion detection, and even socks and onesies that stream temperature, heart rate and oxygen levels, sleep activity and body position data to their parents' smartphones. This networked abundance of AI technologies in the nursery is dedicated primarily to monitoring the infant's vital signs in order to give anxious parents some peace of mind. In the process, infant data doubles are created and recreated, fed through smart algorithms and subsequently inform how parents parent.

In a phenomenology of parent-infant relations in the neonatal intensive care unit (NICU), Michael van Manen (2013) homes in on the neonatal monitor as, on the one hand, a noninvasive medical technology, and on the other, a medial environment that "places the parent in an interpretive relation to the child.…Penetrating beyond the visible, the monitor discloses and reveals hidden, inner aspects of the child" (p. 45). Today's AI-enhanced baby monitoring devices similarly transform the sleeping infant into a "smart" cyborg, a networked human-AI hybrid conscripted into an ongoing, interpassive and algorithmically conditioned communication world with their parents. The infant's quick heartbeat, sweet warmth, quiet coos and urgent cries are heard by the parent not only as intuited sensibilities of care. The child also appears as streams of consumable data: digital readouts, daily charts and artificially intelligent interpreted calculations.

As the infant grows, AI-powered things and playthings may quickly find their way into young hands: from parents' touch-sensitive mobile devices and voice-activated virtual home assistants like Alexa and Siri to smart robots and digital companions like Woobo, Roybi and Moxie. According to a recent study (Pew Research Center, 2020), half of the US parents surveyed reported that their 0 - 2-year-old children use or interact with a smartphone (49%), and a third with a tablet (35%). Overall, infants and toddlers spend about 50 minutes on a screen each day. Between ages 2 - 4, this figure jumps to 2 ½ hours, and for children ages 5 to 8, more than 3 hours/day. About half of the 2 - 4-year-old group have their own mobile device—for example a smartphone or tablet, and two-thirds of 5 - 8-year-olds have their own device. And despite a few spectacular failures (such as Mattel's Hello Barbie and Cynthia Breazeal's Jibo), a growing assortment of specialized smart toys, robots, and child-friendly tablet extensions is establishing a robust market among anxious parents by promising "creativity", "interactivity", "intelligence" and even "friendship" for their young children.

AI Policy and Children

In the midst of this domestic proliferation of smart devices, a multi-jurisdictional survey of existing laws regarding children and toys found that "no laws currently exist that directly regulate or mention AI" (Baker McKenzie, cited in World Economic Forum, 2019, p. 12). This situation may be quickly changing. Since 2019, several comprehensive ethics and policy documents regarding AI applications for children and in K-12 education (AIEdK-12) have been published to help guide AI regulation for children (Adams et al., 2021). In their review of five AIEdK-12 policy documents, Adams et al. noted that each statement promoted AI as a "right" and a "good" for children, upholding a vision of smart technology enhancing human capacity and empowerment. Numerous risks and tensions were also identified and in each case, guidelines or ethical principles are proposed to address these issues. Most concerns identified echo technoethical issues already raised regarding AI in broader society such as algorithmic bias automating discrimination and systemic racism, AI-based profiling limiting opportunities and development; surveillance, data privacy and security violations; exacerbation of the digital divide. Further, when compared to other cross-sectoral AI ethics guidelines, the AIEdK-12 documents shared multiple common ethical

principles including Transparency, Justice and fairness, Non-maleficence, Responsibility, Privacy, Beneficence, Freedom and autonomy, and Trust (Jobin et al., 2019). In addition, Adams et al. (2021) identified four other principles: Pedagogical appropriateness, Children's rights, AI literacy and Teacher well-being.

Of the five documents reviewed by Adams et al. only two of these documents are inclusive of infants and preschool children: the World Economic Forum's (2019) *Generation AI: Establishing Global Standards for Children and AI* and UNICEF's (2021) *Policy Guidance on AI for Children 2.0.*[13] UNICEF (2021) also published a companion document, *Tools to operationalize the UNICEF policy guidance on AI for children*, with a "Development Canvas" (DC) to "support the design and development of AI applications for children" (p. 5). The DC, while intended for use by AI developers, provides a succinct summary of the larger ethical questions and concerns that parents and teachers today ought to be concerned with. The top three design requirements listed are:

- **Positive effects on children**: > What are positive effects for children? (e.g. education, health, entertainment) > Are you measuring and communicating positive impact? How?
- **Negative effects on children**: > Can children be negatively affected by this project? If yes, how? > How are limitations and risks dealt with and communicated?
- **Child development and well-being**: > Is the project specific to a particular age or development group? If not, can it be more tailored to the target group? > How does the project contribute to upholding children's rights and improving their well-being? > Does the project support the SDGs (Sustainable Development Goals)? Which ones? (p. 6)

Through these questions, the UNICEF DC also hints at the media ecological or "pharmacological" (Stiegler, 2010) nature of AI by attending to both the positive and negative effects of AI on children, as well as its broader focus on child development and well-being. In his *Phaedrus*, Plato describes the technology of writing as a *pharmakon*.

> The Greek *pharmakon*—from which our words pharmacy, pharmacology and pharmaceuticals derive their origin—means recipe, cure, life-giving potion and sacrament, but ironically also drug, charm, perfume, and poison…Plato *reminds* us that every technology is always a flickering mirror play of both poison and cure, interior and exterior, recipe and spell, white magic and dark sorcery, life-giving potion and dangerous intoxicant. Every pharmacological prescription is remedial only in its carefully measured application. Too little and it doesn't work. Too much and it acts as a poison. Moreover, we are all ferocious users of this potent drug called technology. (Adams, 2017, p. 231, italics in original)

Nonetheless, as with many such AI ethical guideline documents, an instrumental, human-centric bias predominates. So while AI's pharmacological duplicities are made evident by examining its "positive" and "negative" effects, such guidelines fail to ask key posthumanist (sociomaterialist and postphenomenological) questions such as: "Who-what" may children be becoming in the midst of today's intensifying technosphere. Further, as a child's cognitive ecosystem is increasingly and habitually extended by and more tightly coupled with AI, a host of new ethical questions arise including: "atrophy and safety"; "moral status and personal identity"; "responsibility and trust"; "interference and control"; and "education and assessment" (Hernández-Orallo & Vold, 2019, pp. 511-512).

"What is in a child's hand" today?

At this juncture, we return to Kouppanou's question, "What is in a child's hand?" and more importantly for this paper, what is in a child's hand *today*? Deep into his little book, *Thumbelina: The Culture and Technology of Millennials*, Serres (2015) recounts the legend of the untimely death of Denis of Lutetia (now Paris) around 250 AD. Denis, a bishop, had been arrested and tortured by the Roman army under the decree of the emperor and was shortly condemned to death by beheading at the top of a large hill. As Serres tells it, the soldiers decided rather lazily not to climb to the hill's summit and instead executed the bishop halfway up. The bishop's head rolled to the ground. Then to everyone's horror, a decapitated Denis picked up his head and continued to climb the slope. Terrified by this miracle, the soldiers ran off. Legend has it that on the way up, Denis took a break to wash his head then kept walking until he reached the present location in Paris (Montmartre in the 18th arrondissement). He was later canonized.

[13] Adams et al. (2021) reviewed a 2020 version of the UNICEF (2021) policy guidance document.

This miraculous cephalophoric event is beautifully captured in a mural by Léon Bonnat entitled, *The Martyrdom of St. Denis* (Figure 1.). Serres recounts this unusual tale to suggest that,

> Not long ago, we all became like St. Denis. Our intelligent head has been externalized outside our skeletal and neuronal head. In our hands, the computer-box contains and manages what we used to call our "faculties": a memory thousands of times more powerful than our own, an imagination stocked with millions of icons; and a faculty of reason as well, since software programs can solve hundreds of problems that we could never solve on our own. Our head has been projected before us in an objectified box. (p. 19)

For Serres, this disturbing image unexpectedly portends an extraordinarily hopeful future. Tomorrow's Thumbelinas and Tom Thumbs—as he calls children in honor of the dexterity of their thumbs in congress with their smartphones—are growing up with their heads fully severed and comfortably nestled in their hands. These young cephalophores or "head carriers" are a new incarnation of (post)humanity.

Figure 1: Léon Bonnat, Le martyre de saint Denis, 1874-88, Public domain, via Wikimedia Commons

Their shut-in skulls have been liberated of the burden of memory, of storing information, and of the procedural knowledge that children would normally be subjected to learn over many years of schooling. This radically exposed young human torso, with a smart device in hand, may now avail itself of a new intelligence under the purview of a spiritually open interiority. This miraculous human-nonhuman creation—made possible by the surgical blade of technology's double-edged sword—has unseated the crowning jewel of the humanist's Enlightenment: our autonomous, *cogito, ergo sum* intellect—and in its place, according to Serres, the "incandescent joy of invention" now rests on our children's shoulders. Tomorrow's cephalophore or head carrier "no longer has to work hard to gain [the] knowledge" once taught in schools since this knowledge is now always ready-to-hand: "collected, connected [and] accessible at her leisure" (p. 20). Instead, the Thumbelina child can focus her undivided attention "to the absence that hovers above her neck...a new genius" capable of truly inventive thought, possessing the cognitive agility to imagine a more democratic, more ethical, and more ecological future. Well, that is the future according to Serres.

Stiegler offers a much bleaker prognosis. While he does not reference Serres, we believe Stiegler would have surely agreed with him on this point: we humans—and our children—are indeed losing our heads to the digital. But instead of phoenixes rising to Serres' unique spiritual and cognitively transcendent occasion, for Stiegler, we

beheaded cephalophores now find ourselves in a perpetual "state of shock". In this stunned and stuporous state, we are, he says, stupid, confused or simply numb. In his book, *States of Shock: Stupidity and Knowledge in the 21st Century*, Stiegler (2015) quotes Adorno and Horkheimer, who wrote in their *Dialectic of Enlightenment* that:

> Stupidity is a scar… Every partial stupidity in a human being marks a spot where the awakening play of muscles has been inhibited instead of fostered. […] [A]t the point where its impulse has been blocked, a scar can easily be left behind, a slight callous where the surface is numb. Such scars lead to deformations. (p. 213-214)

Since the arrival of digital technologies and its global networks, we have been increasingly outsourcing and offloading our memories, as well as other cognitive, social, cultural, and political work to electronic devices, and thereby creating a scar where our thinking heads used to be. In his *Understanding Media: The Extensions of Man*, Marshall McLuhan (1964) similarly describes the shock and numbness that transpires in the amputative wake of extending our body's perceptual reach. For McLuhan, electronic (digital) technologies "amputate" the nervous system including the human brain with its connective networks of synapses.

With the extensions of artificial intelligence, our critical, school-booked intelligence is being atrophied and deformed. We are more and more, according to Stiegler, living in a state of numbed stupidity. In the context of the digital, says Stiegler, "reason is ...autonomized--and as such becomes rationalization" (p. 136). On the one hand, AI, machine learning and the digital are profoundly extending our intelligent, cogitating selves. On the other hand, we are simultaneously losing our expertise, our savoir-faire is liquidated, each time we relinquish our hard-won practices of thinking and doing to the machine. Herein lies our stupor and stupidity and the double-edged sword of digital technology.

Unlike Serres, Stiegler does not foresee a spiritual awakening but a disturbing darkness where parents and educators must travail on behalf of children's future redemption from the artificially intelligent claws of big tech. Here, Stiegler (2010) presents a compelling picture of how the 'width' (and depth) of our critical-minded, modern attentional structure—the one that is normally developed in schools through learning how to read, write and do arithmetic--is being unpinned in our youth via psychotechnologies such as mobile devices and smart technologies (as opposed to psychotechniques such as reading a book) that act to foreshorten and erode the retentional and protentional bookends of attention—our memory and our imagination. Our educational institutions, that is, the systems traditionally "responsible for interiorizing the grounding retentional (memory) mechanisms connecting space and time", are being destabilized by our global complex of digital infrastructures. This disorientation involves gradually collapsing our 20th-century umbilical to local space and local time and resituating our attentional structure—consciousness—in a deeply programmed, synthetic substratum in the 21st century. In the programming industries attempts to restrain, secure and retrain our undivided attention…our consciousness is being splintered into micro-moments and territories, to be divvied up to the highest bidder.

Thus for Stiegler, putting artificial intelligence in the hands of the child is a deeply questionable affair. Smart software, especially, tailors and situates itself and speaks to the unguarded fleshy boundaries of our human thinking, doing and becoming. It is here that digital technologies touch us, intertwine their fingers in ours, and enfold us in their artificially intelligent embrace. It is here where we encounter inter-activity, but also inter-passivity, whereby we give over portions of our human agency—and responsibility—to the machine. For Stiegler, the eventual outcome of our submergence in this global digital *pharmakon*—designed by the programming industries to anticipate and thus control our micro-thoughts and movements—will result in the loss of individuation, and a silent "dissolve into a globalized, impersonal One" (Stiegler, 2011, p. 5) or quasi-inexistence.

Tomorrow's posthumans, networked learning and postdigital education

Returning to Serres' image of spiritual incandescence and tempered by Stiegler's understanding of the possible stupors of this heady artificial intoxication, it seems clear that parents and educators must exercise special care in choosing what cognitive "AI extenders" (Hernández-Orallo & Vold, 2019) they put in the hands of our young cephalophores. As Catherine Malabou (2019) suggests, "AI is no neutral technology; it is a transformational technology, challenging the architecture of traditional information systems and thereby bringing about a total upheaval of being-in-the-world" (p. 146). We have profound existential challenges before us. As pedagogues, we are ethically bound not to prescribe any and every new technology that arrives at our doorstep, but instead, to select and administer them judicially and with care to the hands of our charges, with due regard for their pharmacological nature, that is their life-enhancing potentials but also their poisonous side effects. Indeed, as the

media ecologists have been telling us for decades, we must wake up to the pharmacological nature of all technology and its reverberating environmental effects. Further, how can school jurisdictions, pre-service teacher education programs and curriculum developers adapt to better receive these young cephalophores?

One step towards this end would be for educational researchers and nonprofit organizations like Common Sense to commit to building an open access 'pharmacopeia' of digital technologies, that is, an ongoing account of AI's and the digital's manifold and interacting effects and side effects. Such a compendium, accessible online, would afford parents and pedagogues a way to critically assess AI's cognitive, perceptual, and social extensions and capacities alongside their possible destructive aspects in the context of the lifeworld of the developing child. How can this be accomplished? Like the recent demand for software companies to provide comprehensive and fair privacy and data sharing policies through enacting laws like the European Union's General Data Protection Regulation (GDPR), educational technology companies must also be required to declare all known or anticipated side effects and contraindications of their software, including possible adverse interactions with other software. To be approved for human use, pharmaceutical companies must provide a comprehensive assessment of the benefits and risks of a new drug along with strategies for managing known risks. It is now time that educational technology companies be held to a similar standard for their powerful software, designer algorithms that are specifically architected to "enhance", "adapt" and ultimately "transform" children's (developing) cognitive ecosystems. Current international policy documents on AI, ethics and children such UNICEF's (2021) *Policy Guidance on AI for Children 2.0* and *Tools to operationalize the UNICEF policy guidance on AI for children* can serve as helpful guides in this direction.

Our phenomenological reflections on "what [technologies are] in a child's hand today" have led to a radical utopian/dystopian revisioning of tomorrow's posthuman: a cephalophore with heady new artificial intelligences at-hand, a "who-what" perpetually plugged into the global matrix. The present social media environment of "crazy talk, stupid talk" (Postman, 1976) and fake news may be a (hopefully) temporary symptom of our collective disorientation and stupor at having lost our heads. Our ability to reason, suddenly severed from our shoulders and outsourced, has been transformed into rationalization or stupid talk until we learn to live well and responsibly as human-AIs. It may take at least a generation or two to adapt to this new postdigital situation. Continued ontogenetic inquiries into the human-nonhuman entanglements and fluid prostheticities of our young may better position us to anticipate future configurations and ethical challenges of networked learning and postdigital education. Meanwhile, today's parents and educators must become media ecologists of the digital, able to discern and weigh the formative as well as the deformative dimensions of new media environments. Our homes and educational institutions ought not to become cathedrals of computation, but sustained cradles of care responsible for nurturing the development of our young cephalophores growing up in our posthuman era of Artificial Intelligence and Big Data.

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SYMPOSIUM 4

Malta Networked Learning Forum 2021: Experiences and Reflections

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Introduction

This symposium presents 3 papers relating to the Malta-based Networked Learning (NL) Forum 2021. The first two papers review the expectations and experiences of early researchers participating in the forum. The third paper presents reflections on the hybrid modality in which the forum convened. The purpose of this symposium and its component papers looking back on a NL community initiative is to look back, inform and look ahead to future similar events which potentially serve novice researchers develop connectedness to the broader networked learning community of scholars and peer researchers.

In this symposium, we use the term 'early researchers' (ERs) rather than the prevalent early-career researchers (ECRs) to distinguish between the graduate and doctoral level researchers grouping which arose for the case of the NL Forum 2021 event from the overlapping doctoral and postdoctoral category to which the term ECRs more commonly refers to (McAlpine, Pyhältö, & Castelló, 2018).

The NL Forum 2021 event

The NL Forum 2021 was one of two so-called node events the Networked Learning Conference Consortium (NLCC) helped to organise in the interim year of the biennial International Conference on Networked Learning. This event was a partnership between the NLCC and the Faculty of Education (FoE) at the University of Malta (UM). The aim of the Malta NL Forum 2021 was to foster international collaboration among ERs and scholars. The derivative aspiration was to support the development and dissemination of research in the NL field, promote the NL field of educational research and practice, and broaden the NL community of researchers and practitioners. The NL Forum 2021 was originally proposed as an onsite event to be held in Malta, but the continuing Covid19 pandemic crisis drove most activities online, turning it into a hybrid event. The only delegates who congregated at the planned physical location were the local hosts, 2 participating researchers and a keynote speaker. The rest of the attendees participated remotely using the Zoom conferencing platform.

The NL Forum 2021event spread across two days (20-21 May 2021). The first day consisted of a public event featuring 3 keynotes and 5 ER presentations. Keynotes took the form of a short thought-provoking presentation followed by small group discussions in virtual breakout rooms. On return to the plenary, participants were encouraged to share group reflections and to extend the discussion with further questions and comments. Participating ERs presented their research work in progress to the international audience attending the forum. Attendees were encouraged to ask productive questions and pose constructive comments to help support ERs develop their work. Attendees were also invited to post further feedback queries and comments using the in-meeting chat feature for ERs to consider later. The second day was structured by a number of collegial learning activities involving ERs and field specialists in a closed researchers' meeting. The closed researchers' meeting intended a space for the ERs to reflect on their work in progress, to access specialist expert support to develop their work, and to consider possibilities for research publication. The design of the NL Forum 2021 generally differed from the traditional conference approach where attendees are mostly passive listeners. The event incorporated several opportunities for attendees to interact, get involved and have their voices heard. There was aspired a scholarly experience featuring open educational practice and peer learning for value creation.

The NL Forum 2021 evaluation

The evaluation study of the NL Forum 2021 was initiated to explore the viewpoint of participating ERs. The study entailed a preliminary comparative analysis of ER expectations and experiences drawing on survey data collected before and after the event, and a deepened exploration of the ER experience of the event based on a focus-group interview held straight away after the event. The first two papers of this symposium share the findings of this evaluation study. Together these papers reveal that the event was an opportunity for ERs to deepen their knowledge and insight of the NL field for developing their research, to expand their personal learning network and grow as researchers. Concurrently, the forum was a substantially demanding experience requiring ERs to move out of their comfort zone. Generally, the emergent description suggests the ERs see significant value in such specialised events presenting their research work in progress to an international audience and bringing them in close contact with field scholars.

The third paper forming part of this symposium is an introspective critical review by the local host team on the hybrid aspect of the Networked Learning Forum 2021. Superficially, the hybrid aspect of the event may appear to be a matter of combined online and offline participation modalities, but a closer look uncovered a broader and deeper terrain of boundary (un)crossings regarding spaces, otherness, and pedagogic stance. The shared reflections invite attention to detail in planning and running future similar hybrid events.

Together the 3 symposium papers open the stage for making NL community events also an object of research and critical review. They highlight the need for cooperative, collaborative and collective inquiry in trustful relationships to also be directed at processes shaping NL community events and the value they potentially create. Above all, the symposium highlights the potential of special interest events aimed to foster international collaboration among scholars and ERs. Perhaps, into the future, such special interest events possibly recurring in the interim year of the biennial NLC, may become an established safe harbour from where ERs start to develop as active members of the NLC community at large.

The NL Forum 2021 blurb collective

Independent of evaluation study disclosures, below are some comments shared by participating ERs and scholars after the event:

> The NL Forum provided me with the ideal platform to engage critically with the concept of networked learning which, like many other concepts, is contested. The second day of the Forum brought me in direct contact with research students, providing me with an opportunity to engage with their work and reinforce elements of the keynote. (Expert scholar)
>
> The format of the event was interactive with various forms of online participation. Many resources and links were shared in the forum and in the chat. Everything was well thought and organized. I was inspired and felt the sense of belonging to the community despite the time zones and a Zoom format. (Early researcher)
>
> During my presentation, I was a little surprised and also happy that I received quite a lot of comments. The second day of the NL Forum was a very good experience. There were many academic experts who guided the early researchers, and the day was planned nicely. (Early researcher)
>
> Participating in this event has been a fruitful learning experience. As an early researcher, the comments and feedback I received from the attendees and the keynote speakers made me feel more confident about how <my research and practice interests> as a teacher professional development model, and networked learning both share common principles that could possibly merge and offer prospects for further research. (Early researcher)
>
> As an early researcher and someone that is relatively new to the field, three main things made me proud and appreciative of being part of NL Forum. Firstly, I was proud to be presenting and talking about an issue that is very important to me. Secondly, I was happy to see how other researchers and scholars engaged with my research and gave me feedback. And lastly, I appreciated the fact that on

> the second day of the NL Forum we were allowed to collectively discuss my research and the research of others in more depth. (Early researcher)
>
> As a co-host, I share a very positive experience. The public forum was an opportunity for early researchers, guest speakers and the general public to come together to discuss research and share insights related to networked learning. This was further enhanced in the closed meeting, held the following day, during which early researchers could share reflections and gain support on their research ideas from guest speakers. (Local co-host)
>
> Participation in the NL forum was a great experience. From the open forum on the first day to the smaller research convening on the following day the time was well spent engaging in interesting discussions and being presented with new ideas that can advance one's own research and thinking. (Expert scholar)

A celebration video of the public event and recordings of the three keynote presentations publicly available on the NLCC website:
Keynote 1: Learning and Value Creation in Open Practices, with Professor Maarten de Laat,
Keynote 2: Networked Learning for what? Higher education as a social act in troubled times, with Professor Carmel Borg,
Keynote 3: Peer-learning and Networked Learning in a PBL context, with Professor Thomas Ryberg.

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The Networked Learning Forum 2021: Early researchers' expectations and experiences

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Abstract

Early researchers (ERs) benefit from opportunities to present, discuss and develop their research work. A typical professional learning experience that may support ERs is their active participation in conferences. In this paper, we report on the expectations and experiences of five ERs who participated in the Networked Learning (NL) Forum 2021 by presenting their research and then having opportunities to gain feedback and insights from one-to-one interactions with more knowledgeable others and the larger community within the event itself.

We draw on qualitative research with our main data sources being a pre- and a post-event online survey. We were interested to explore the extent to which the experiences described by the five ERs participants met their pre-event perceived views and expectations. While the pre-event survey delved into the participants' professional background, motivations for participation and expectations, the post-event survey targeted participants' perceptions about their learning and potential takeaways.

Findings indicate that the five ERs saw their participation as an opportunity for their professional development and as an avenue to make and create professional connections with others in the same field of research. Most notably, they expected feedback from the NL Forum 2021 community and their interactions with field experts (referred to also as knowledgeable others) as support that could help them gain new and deepened insights for developing their research ideas and work. In describing their experiences (post-event), participants highlight opportunities for one-to-one conversations with experts, discussions in small groups, individual and collective reflections, connections with other ERs and the possibilities for expanding their professional learning networks. These findings highlight the importance of design features when offering events specifically targeted for ERs. In particular, findings indicate that creating an intimate, interactive and safe environment is essential for ERs to feel confident to present their research, critically analyse new perspectives and knowledge shared by others, and eventually acquire new knowledge.

Keywords

Conference, Expectations, Experiences, Higher Education, Early Researchers, Networked Learning.

Introduction

Conferences, spanning across academic and scientific disciplines, play an important part in the professional activities that research academics engage in (Rowe, 2017). Generally, it is the aim of conference organisers to broaden the participation of diverse groups (Casad, Chang & Pribbenow, 2016) and offer them the opportunity to meet, interact and network. One such target group is early researchers (ERs), particularly because of their novice experience in the field of research and, as a result, their professional need to further develop their research repertoire and presentation skills.

The NL Forum 2021 was organised with this end in mind. It was conceived and planned to bring together and provide support to a small group of ERs in the field of Networked Learning (NL). The NL Forum 2021 thus aimed to provide this group with an educational and networking space for collegial interactions between experts and

novice researchers. While it sought to provide a friendly environment within which they could obtain feedback on their research and exchange experiences, it also offered ERs an opportunity to explore possibilities for getting published.

In this paper, we report on our exploration of the extent to which the experiences described by the five ERs participants in the NL Forum 2021 met their pre-event perceived views. To do this, we designed a qualitative study that included two data collection phases: a pre-event and a post-event online survey. While the pre-event survey focused on the ERs' reasons for participating in the NL Forum 2021, the post-event survey targeted their experiences presenting, receiving feedback and engaging in discussions with field experts. This constitutes the first part of the NL forum 2021 evaluation study. The second part of the study sought to deepen insights captured through the post-event survey on the experience of the event for learning and development from the participating ERs' perspective.

Literature

Conferences are generally held to facilitate knowledge sharing among researchers and academics and to support formative higher education and continuing professional learning and development (Chapman et al., 2009; Lang et al., 2019; Rowe, 2018). They also provide the place and space for dissemination of latest research and for networking. While there are different types of conferences, most generally target large numbers of participants and tend to rely on a one-to-many form of communication with limited opportunities for interactions among attendees (Edelheim et al., 2018; Rowe, 2017). However, the research conducted by Rowe (2018) shows that participants value conference events that involve active participation and opportunities for making contributions. Moreover, findings from this research suggest that participants have different needs that include sharing knowledge, increase their visibility as researchers and the need to be acknowledged by others within the field. Indeed, as Edelheim et al. (2018, p. 105) contend, with regards to academics' participation in conferences

> we are simultaneously constructing our own identities as academics: the things we do, the sessions we attend, the questions we ask (and refrain from asking), the connections we develop, and the ensuing research we work on are all part of making us into the selves that we experience and others see.

The most recurrent factors for attendees in choosing to attend a conference is that the focus is on their area of interest, they would have the opportunity to share their work, the presence of knowledgeable keynote speakers and the potential for networking (Edelheim et al., 2018; Lang et al., 2019). A study conducted with educators who attended an online professional development initiative shows that their attendance was based on having the opportunity to ask questions to experts leading the sessions, getting to know and discussing with others who have a common interest in the field and sharing ideas (Poce et al., 2021).

Conferences are a means by which ERs, and in particular doctoral students, can learn to become practitioners and possibly establish themselves in the world of academia (Chapman et al., 2009). However, the experiences offered by conferences for career development of ERs is under researched (Chapman et al., 2009; Jennings et al., 2009). James et al. (2009) explain that ERs as those who are uniquely situated in their career stage of academic research and attempting to build their professional research profile. For ERs, this is a phase that defines a stage of learning, development and growth into academia (Medcalf, 2011).

Chapman et al. (2009) conducted a study about the expectations and experiences of doctoral students who had attended the 2005 International Research Conference of the Academy of Human Resource Developments. They report that doctoral students had varied expectations and professional development needs. Of particular relevance to our paper are findings that relate to the challenges that these research students encountered. In particular, these challenges related to (1) the lack of time and space for interaction, (2) field experts who were not sensitive to students' needs, and (3) students having lack of experience with participation in past conferences and not feeling a sense of belonging within the conference community. Such experiences relate to Lave and Wenger's (1991) concept of 'legitimate peripheral participation' and, hence, to the challenges of ERs in socialising as they become full members of a larger and more expert community of researchers.

According to Jennings et al. (2009), ERs may develop themselves better by becoming part of and establishing themselves within a community of more-experienced academics, that is, of like-minded people who help them develop their identity as researchers while also offering them support and the space to practise research and to

enhance their skills as researchers. For ERs, maintaining relationships with field experts (e.g. past supervisors, university colleagues and other knowledgeable others) related to their area/s of interest is essential for their professional growth. In their transition to academia, they need to develop the confidence to share their research ideas and become critical about their research and that of others. As Medcalf (2011) claims, for ERs, the challenge is to be able to articulate the research and develop the courage and confidence to present their work to more established academics.

Research Method

Data collection

The pre-event survey consisted of seven questions – two closed and five open-ended. The closed questions generated demographic data about the five participants related to their professional role and their years of experience in this role. The remaining open-ended questions sought deep insights related to how networked learning related to their professional role and/or their research and development interests, their reasons to participate, their expectations, their research and development needs and the extent to which they thought that participation in this event would address the research and development needs they had identified. In order to be able to compare participants' perceived views to their actual experiences, the post-event survey followed the same structure and questions were relatively similar. For example, the first two questions required the same information as those in the pre-event survey. The remaining five questions were again open-ended and required participants to write about the extent that their participation met their perceived pre-event views, the event activities that they found most useful, aspects of the event that they would keep and those that they would change or plan differently. Finally, they were asked to describe the most important takeaway from participating in the NL Forum 2021.

Each survey, which was designed and offered online using Google Forms, took between five to ten minutes to complete. The pre-event survey link was sent through an email a week before the event while the post-event survey link was sent via Zoom as soon as the event ended.

Collaborative data analysis

In embracing the essence and implementing the main scope of NL, as researchers we adopted a collaborative qualitative analysis. Moreover, considering the explorative nature of this study, a collaborative qualitative approach within the interpretative paradigm (Cohen, Manion & Morrison, 2018) was deemed to be most suitable for understanding expectations and experiences from the participants' own words. Cornish, Gillespie and Zittoun (2013, p. 79) define collaborative data analysis as "processes in which there is a joint focus and dialogue among two or more researchers regarding a shared body of data, to produce an agreed interpretation". We adopted this approach because we recognise that we, as researchers, see the world from a different point of view. Thus, our approach to collaborative data analysis stems from a common belief that, as constructivist researchers, we acknowledge that there are multiple realities to a situation and that integrating our diverse perspectives and research backgrounds could generate more robust findings (Cornish, Gillespie and Zittoun, 2013; Moran-Ellis et al., 2006). We think that by integrating the first author's research interests in the design of continuing professional development opportunities with the second author's interest in the field of learning and teaching using networked technologies in higher education learning settings would generate, on the analysis of the data, deeper insights into how an event such as the NL Forum 2021 could benefit ERs' research and development needs.

Our researchers' roles required us to take a step back and adopt a critical approach to analysis. Being critical meant that we engage in ongoing dialogues that took place face-to-face and online. For example, the pre-event survey responses were first coded separately. This was followed by a discussion meeting to reach an agreement on the initial codes and work on developing a set of surfacing themes. Although quantification of the intercoder reliability (O'Connor & Joffe, 2020) was not sought, the authors still noted the high rate of agreement with the few disagreements dissolving in the discussion and configuration of themes and subthemes. Our collaboration in the data coding process allowed for a more systematic, rigorous and transparent approach. The same procedure was followed for analysing the responses to the post-event survey. This collaborative data analysis approach incorporating such an intercoder check served as a means to build reliability (Barbour, 2001) on our interpretation of the research findings. Largely, we think that the fidelity and trustworthiness of the research findings (emerging from the data but also as a result of our personal experiences and beliefs) is fundamentally shaped by the collaborative and critical approach assumed by the researchers through all stages of the research design and development.

Data analysis generated different sets of codes which were discussed and then collaboratively elaborated and developed into themes that informed the emerging findings. For example, data in the pre-event survey included the following codes: 'obtain feedback', 'knowledgeable others', 'personal learning networks', 'support', 'presenting experience' and 'deepened insights'. These pre-event codes were then merged with the post-event codes to identify emerging themes (see Table 1 for more details).

Codes		**Themes**
Pre-event survey	**Post-event survey**	
obtain feedback; deepened insights	discussion; fruitful conversations; reflection; confidence in being a researcher	• Gaining insights and deepened knowledge • Acquisition and participation • Access to knowledgeable others • Expanding the personal learning network
support	acquired resources	
presenting experience	presenting research	
knowledgeable others	meeting experts one-to-one; intimate meeting	
personal learning networks	connecting with others; expand professional learning networks	

Table 1: The data analysis

The next section presents the findings of the pre-event and post-event surveys. We present an interpretation of the five ERs' expectations and experiences of a NL event which was primarily intended to provide them a space for support in presenting and developing their research towards publication.

Participants' demographics

All participants were ERs but otherwise it turned out that demographically they were a varied group. Two participants were university teachers reading doctoral studies. One participant was in a school leadership position with a Masters' degree level educational background. This participant was doing research on her own initiative. Two other participating researchers were pursuing a Masters' degree award. One of these postgraduate students was a full-time school teacher and the other was a full-time student. For these two latter researchers, the Networked Learning (NL) Forum 2021 was a first-time experience presenting their research in progress.

Findings

Participants provided specific reasons for participating in the NL Forum 2021. These included exploring and deepening knowledge of networked learning and developing professionally. For example, for (P4), notwithstanding her prior participation in past events, this forum motivated her to participate due to

> Professionalism and expertise of one of the hosts, and participation in past events. Every time I participate, I am so encouraged and inspired by new ideas and approaches that are always presented at networked learning events. This event is a new challenge for me. (P4, pre-event survey)

These five participants sought to understand the extent of their contribution to the field of research, 'grow further as an early researcher' (P2, pre-event survey) and 'gather more knowledge regarding the academic world of publishing' (P3, pre-event survey). This suggests that participants viewed the NL forum as an approach to improve their research practice. Others also mentioned that it serves for supporting personal networks. For example, P1 and P2 expected that the NL forum will:

> Provide possibilities to engage in, be part of and enlarge my network and to experience new learning prospects created from engaging in my field of research as a professional development experience. (P1, pre-event survey)

> Assist me in further developing connections with a group of learners and maintaining these connections to relay better information. (P2, pre-event survey)

These expectations indicate that participants also viewed the NL forum as an opportunity for professional development that could further sustain and expand their professional learning networks. The post-forum survey responses showed that the forum served participating researchers to expand their personal learning network, access to knowledgeable others, gain insights and deepened knowledge and obtain support for researcher development. There was a focus on acquisition affordances of the event but more still there was attention to the participatory orientations of the event. As participant P3 commented about the experience:

> It was a unique opportunity to take a step back and reflect on my research work. I was also able to connect with international peers and field experts and get some insights and ideas on how networked learning is achieved. (P3, post-event survey)

These ERs most strongly valued access to knowledgeable others. In the post-survey, participants repeatedly referred to the opportunities to discuss their research with knowledgeable others, to directly interact with field experts and to obtain expert advice. The one-to-one "Meet the Expert" activity, which was part of the researchers' meeting, was especially emphasised by all participating researchers. It was valued for permitting such close contact between novice researchers and field experts. In fact, one expressed the idea for a future similar event extending the activity permitting the novice researchers to consult with different specialists so giving them more time 'to be listened to' (P5, post-event survey). Two participating researchers also called for more structure and clarity with regards to a small-group Zoom breakout room activity. Attention was drawn to an initial moment of hesitance related to the lack of clear guidelines from the hosts before this activity took off. Considering that the elicited criticism and recommendations for improvement were mostly directed at this activity suggests substantial capacity of such a networking activity to support novice researchers in their academic pursuits. In fact, all participating researchers explicitly singled out this activity and the encompassing researchers' meeting as the most useful aspects of the forum. Evidently, novice researchers valued extended time periods in direct contact with knowledgeable others for supporting their research.

Their expectation for a potential opportunity to share their research and 'get some feedback on getting published' (P3, pre-event survey) were recurrent aspects shared by the participants in the pre-forum survey. Indeed, participants shared their views about what to expect out of this event, mostly related to presenting their research, learning from more knowledgeable others and obtaining feedback to improve on their work.

> It will be an opportunity to present and discuss my research work with international peers and field experts. I expect this to help me reflect even further on my research work and perhaps provide me with a greater insight. (P2, pre-event survey)

> Belonging to a community, having access to keynote speakers and their ideas, presenting my research and getting feedback are aspects that I am looking forward to. (P4, pre-event survey)

> I expect to familiarise myself with different research approaches and understand how others view my research and topic. (P5, pre-event survey)

Participants also expected that such an event would serve as a support structure to deepen theoretical knowledge and strengthen the research being presented by the insights and critical feedback from others.

> Through the feedback gained and the discussions created with the keynote speakers and attendees, further thoughts and deliberations could be generated on how networked learning and professional development could both work conjointly to support and enhance teacher learning and development. This could also lead to the possibility of further research and the writing of a paper on these areas. (P1, pre-event survey)

> Judging by the experience of the organizers, keynote speakers and the researchers, and the design of the event, I believe it can help me gain insights into my research. (P3, pre-event survey)

> The opportunity to talk directly about my research is rare for me as I am a part time distant student. I am interested in critical feedback and identifying some weak aspects of my research for me to strengthen it theoretically and methodologically. (P4, pre-event survey)

In the post-forum survey, all participating researchers referred to the fruitful discussions they had experienced. These discussions were variously claimed to have permitted acquisition of resources, feedback on research and gaining insights to deepen and extend their knowledge. The most useful activities were those that provided them with space and time to discuss their research leading to the acquisition of feedback, resources for knowledge development and deepened knowledge on research development. While one participating researcher stopped on acquisition (of deepened insights) as the most important take-away from the event, the other four signaled connectedness with others. These four participants saw this connectedness with others as serving to fulfil their expectations of the event. They noted that, as expected, the NL forum permitted them to connect with international peers and field specialists. Connections developed by listening to the presentations of other researchers and the keynotes and actively participating in 'fruitful conversations (P5, post-event survey). From participating researchers' disclosures, in a sense the forum served as a means to expand the personal learning network.

Furthering this idiosyncratic perspective, multiple responses in the post-event survey referred to researcher development. Researcher development was seen happening in 'presenting research to others' (P4, post-event survey) and the experience of 'receiving feedback' (P2, post-event survey). Presenting and receiving feedback were claimed to build the novice researchers' 'confidence' (P4, post-event survey) and 'self-esteem' (P4 and P5, post-event survey). As one of these participants put it 'we were not considered as 'one of many' but were given importance and particular attention' (P4, post-event survey).

For these ERs, this NL forum was a space to present and discuss their research work while also gaining valuable feedback from more knowledgeable others that could help them develop their capabilities as researchers. From what was shared by the participating researchers, the NL forum was a means for deepening and extending knowledge of networked learning, a network for gaining insights and critical feedback for strengthening their research, and a site for growth as researchers and professionals in the broader education realm.

Discussion and Conclusion

Findings indicate that the ERs' experiences of the NL Forum 2021 corroborated with their pre-event expectations. These ERs were intrinsically motivated to attend, particularly to gain new insights and deepen their own knowledge of networked learning. They attributed this acquisition of knowledge to their participation in the event activities offered – presenting their research, getting feedback from attendees and discussing their work with more knowledgeable others. As Rowe's (2018) research shows, the active and collaborative engagement of attendees has a positive impact on their learning. In the case of our five ERs, they viewed this kind of participation as an opportunity for their professional development as researchers (e.g.: in getting their work published) and to expand their personal learning network and build their professional research profile – a finding also reported by Edelheim et al. (2018) and James et al. (2009).

Similar to the findings by Chapman et al. (2009), our five ERs reported different reasons for participating in the NL Forum 2021 event. However, the opportunities for learning that the ERs in our study shared appeared to converge. Most notably, they related their learning to the one-to-one session that they had with a more knowledgeable other. Unlike other conferences, where the more knowledgeable others are generally the keynote speakers who address a large audience, in the NL Forum 2021 keynote speakers also engaged more closely and actively in one-to-one and group discussions with the ERs about the work that ERs presented and issues related to their research journey. This aspect, of ERs engaging in conversations with and receiving targeted feedback from more knowledgeable others, is quite revealing in view of the learning and development opportunities that such events can offer. For ERs, this aspect is indeed key since, as Medcalf (2011) claims, ERs pass through a delicate stage of learning, development and growth into academia and, in the process, they build their own identity as researchers (Jennings et al., 2009).

The implications of such findings draw us to the design of events (particularly, conferences and fora) as professional development opportunities specifically intended to enhance and facilitate the process through which ERs may become part of a community of more-experienced academics and eventually establish themselves as researchers. Based on our findings, we think that such opportunities should: (1) consider, integrate and address the diverse need of ERs; (2) include a range of activities requiring ERs active and collaborative participation supported

by more knowledgeable others, when and as ERs request it; and (3) span over an extensive and extended period of time so that leaning for ERs becomes an ongoing process rather than a one-off event.

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Early researchers' experience of a networked learning forum: a site of learning and challenges

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Abstract

International conferences and fora bringing together a diverse group of researchers, scholars and practitioners are claimed to be sites of learning and networking. This paper reports on the findings of an explorative study investigating the experience of early researchers participating in the Networked Learning Forum 2021 which was specifically planned to support their learning and development. These qualitative findings are part of the encompassing evaluation study of the event more generally. This part study implemented thematic analysis on transcript data of a focus-group interview held with participating early researchers soon after the end of the event. In this paper, we share the thematic description of the early researcher's experience as emerged from this group interview. This description generally confirms the preliminary survey findings showing up the Networked Learning Forum 2021 as a site of learning and development. But distinctively, in this part of the study, the event surfaced as a site of early researcher challenges. 'Learning experience' came to the fore as a strong core theme configured by 4 primary, constituent themes; 'event organisation', 'interactions', 'means of acquisition' and 'researcher challenges'. Each of these 4 primary themes was structured by a number of subthemes.

This thematic description of the Networked Learning Forum 2021 experience from the perspective of participating early researchers, highlights the event as a compelling, participatory event bearing substantial academic advantage for learning and development. Distinctively, the academic advantage emerges as closely linked to what are identified as researcher challenges. This thematic picture, based on a single case, is very limited in scope. Further research is needed to verify claims. But meanwhile it is reasonable to listen to the recommendations made by the early researchers of this study encouraging similar events. Such events make it easier for beginning researchers to connect with experts and international peers. They facilitate beginning researchers to present their research to an international audience within a relatively less intimidating environment compared to typical international conferences which are much larger. They provide a space for beginning researchers to be challenged in developing research related competences and emotionally grow as researchers.

Keywords

Conference, Higher Education, Early Researcher, Networked Learning, Experience, Hybridity

Introduction

Conferences and conference-like academic events are pinpointed as sites for learning and development (Coryell & Murray, 2014; Jacobs & McFarlane, 2005). This is deemed to be especially so for graduate and doctoral level researchers attending and participating in such academic events. The purpose of this paper is to report on qualitative findings describing the experience of such a graduate and doctoral level researcher group participating in the 2-day Networked Learning (NL) Forum 2021. As pointed out in the symposium introduction, we use the term early researchers (ERs) rather than the popular term 'early career researchers'(ECRs). We do this in recognition of the arising researcher grouping of this specific study from the overlapping categorisation of doctoral and postdoctoral students to which the acronym ECRs commonly refers to (McAlpine, Pyhältö, & Castelló, 2018).

The concept of the conference as a public learning site traces back to more than a century ago (Sandlin, O'Malley, & Burdick, 2011), but research on conferences and fora to support beginner researchers appears to be a recent development. This evaluation study investigating the experience of participating ERs of the NL Forum 2021 contributes to this growing research strand.

Conference events as sites of learning

Conferences and fora are considered especially useful for supporting beginning researchers (Campbell, Wick, Marcus, Doll, & Yunuba Hammack, 2021; Craus, November, 2016; Fakunle, Dollinger, Alla-Mensah, & Izard, 2019). Jacobs and McFarlane (2005) note that a specific aim of conference events is to induct inexperienced researchers. Specifically with reference to doctoral students Chapman et al. (2009) declare conferences as a route for exploring the chosen disciplinary area and find ways to get more involved in professional communities. In drawing attention to the community of practice (Wenger, 1998) for framing social learning situations and the process of situated peripheral participation (Lave & Wenger, 1991), Hilliard (2006) insists that established scholars need to take responsibility supporting newcomers to become more involved and develop as active members of the learning community. In general, Jacobs and McFarlane (2005) maintain that conferences are knowledge-building events forging a "reflective community of practice" that includes field experts and inexperienced others to present, critically discuss and evaluate recent developments, and to advance research and professional practice both substantially and methodologically (p.319).

Conferences and fora are proposed as pedagogical sites whereby educational activity and learning happens outside the bounds of formal learning "in extrainstitutional spaces and discourses" (Sandlin et al., 2011, p. 338). Emphasising the "public pedagogy" perspective of conferences, Burford, Henderson, and Pausé (2018) refer to the "traditional conference" which they pinpoint as featuring a banking approach (Freire, 1996) to learning. By no means is the reference to Freire's work here meant to draw parallels to the far-removed context of Brazilian rural peasants who inspired the work of this distinguished pedagogue. It is rather the acquisition learning approach as distinguished from participatory methods that is being evoked. And this is not in any way to suggest that these main learning approaches are in opposition to each other (Cutajar, 2019; Sfard, 1998).
From their declared feminist positioning, Burford et al. (2018) call to question the pedagogical aspect of conferences as sites for learning. They appeal for conference events to be more participatory. They even suggest that delegates introduce themselves and share their attendance goals for creating a more inclusive conference environment. For the case of the NL Forum 2021, such finer details in the attempt to create a participatory conference experience were adopted more strongly on the second day of the event featuring the closed researchers' meeting. But the participatory approach generally extended across the whole 2-day event. For the public forum of the first day, attendees were provided with numerous opportunities to interact, get involved, and have their voices heard as put on show by the enfolding symposium introduction. This paper sharing a description of the event experience from the participating ERs' viewpoint, presents it as a pedagogical site of learning confirming literature affirmations but distinctively shows it a site of challenges.

Contextualising literature

Studies on the experience of conference and fora events are scarce. Studies on beginner researchers' experiences of conferences and fora are even less common, and are mostly recent additions. Fakunle et al. (2019) note that although networking is said to be very important to support beginner researchers' learning and confidence development being part of a network, conference attendance is hardly ever required when reading graduate studies. According to Fakunle et al. (2019), funding and career aspirations are two motivations compelling doctoral researchers to attend conferences. Lack of funding and beliefs that conference attendance has no significant influence serving aspirations deter attendance. Fakunle et al.'s (2019) observations appear to have been followed up by Campbell et al. (2021) months before the disruption of mass events due to the Covid19 pandemic. Campbell et al. (2021) investigated graduate students who were compelled to attend a conference from a choice of two alternatives as part of their masters' level study programme. Reporting on qualitative findings analysing student interview data collected before and after the conference attendance, Campbell et al. (2021) report that students learnt by accumulating subject knowledge, broadening awareness of field trends and values, drawing on a sense of belonging being part of a diverse assembly of conference attendees, and appraising personal knowledge measuring up themselves to scholars and professionals. They also note that the intellectual aspect emerged strongly, and along with it there was detectable an emotional trace.
Reporting on doctoral students' experiences of conference attendance Chapman et al. (2009) position these early researchers on the periphery of the congregating scholarly community. Unsurprisingly, the researchers found that first time attendees are the most likely to be challenged in trying to become part of the scholarly community. They

affirm that the doctoral student experience was affected by expectations, approach and personal characteristics. Chapman et al. (2009) found that doctoral students encountered "more barriers than bridges across the "scholarly divide"", the most notable being the conference organisation and structure.
Based on their investigation considering doctoral students participating in an international forum, Coryell and Murray (2014) draw attention more directly on the emotional aspect along with the intellectual perspective of learning through the conference experience. They note that the emotional perspective closely correlates to inexperienced researchers and attendees who are relatively new to the conference disciplinary area. The evaluation study of the NL Forum 2021 links up to this nascent literature corpus further shedding light on what makes the conference experience an emotional one for beginner researchers well as an occasion for learning.

Most of the unearthed studies were with reference to physical attendance to conferences taking place in pre-Covid19 pandemic times. Notable, there is a growing mass of studies investigating the use of technology enabled back-channels for networking in relation to conference events such as Jacobs and McFarlane (2005), Kimmons and Veletsianos (2016), Greenhow, Li, and Mai (2019) and so on.
The recent Covid19 pandemic is speeding up the growing strand of literature on the worthiness of a virtual conference event and its setup (e.g. Haji-Georgi, Xu, and Rosca (2021)) and how to maximize the potential of their value (e.g. Rubinger et al. (2020). Generally, studies emphasise the importance of detailed planning, active engagement of event attendees, and attention to review feedback. The evaluation study of the NL Forum 2021 which convened in hybrid modality for adhering to Covid19 restrictions and social distancing measures also links up to this growing strand of research literature on technology mediated conference events concurrently extending the developing picture of beginning researchers' attendance and experiences of conferences for learning and development. In this respect, this small-scale study brings a new situational perspective to the literature corpus.

The NL Forum 2021 was specifically organised as a NL event to support early researchers in learning and development. A description of the NL Forum 2021 event is shared in the enfolding symposium introduction. The design of the event was intentionally shifted from the "traditional conference" method pinpointed by Burford et al. (2018) to provide attendees a more participant-centred experience. The in-depth exploration of the participating ERs' experiences of the NL Forum 2021 provides a new perspective to the developing picture of international conferences and fora as sites of learning and networking. The research reported in this paper confirms it but exposes several challenges as well. The next section briefly outlines the research methods leading up to a qualitative description of the event from the perspective of participating ERs.

Research Methods

The exploration of the ERs' experiences reported in this paper forms part of the encompassing evaluation study of the NL forum 2021. The other part of the study looking into the ER's expectations and experiences of this event is reported by Calleja & Cutajar (2022) which also forms part of the trio making up this Networked Learning Conference 2022 symposium. For this part of the study, the research question which we sought to answer asked: *In what ways did the participating ERs experience the NL forum 2021 as an academic event for learning and development, if at all?*
The qualitative approach within the interpretative paradigm (Cohen, Manion, & Morrison, 2018) was assumed for answering this research question in the attempt to dig deeper into the ERs' experiences as they chose to share it with the researchers soon after the event. In the attempt to deepen our understanding of participating ERs' experiences of the event, we invited the participating ERs to a focus-group interview. The 60-minute group interview was held after the end of the 2-day event. For the interview, 2 of the 5 research participants were physically on location with the researchers while the others joined remotely. The first research author led the interview and the second research author intervened as deemed useful. Ideally, an independent interviewer was hired for conducting the focus group interview but, at the time, several situational factors deterred the possibility. The insider privileged positioning of the researchers carried risks of contaminating the data set as an authentic source for forming the basis of the sought qualitative description of early researchers' experiences of the event. The researchers relied on the equitable participation tone and group reflective mood of the researchers' meeting propagating into this post forum group activity, a sustained effort by the researchers retaining a non-judgmental, learning mind-set, and strict adherence to neutral questions through the course of the interview: *How would you describe your overall experience during the event? To what extent did this event meet your expectations and in what ways did it or did it not? Which activity did you feel was most enriching to you, and why? Which activity was the most challenging for you, and why? To what extent did you receive support, and in what ways, and why?*
The verbatim transcription of the focus group recording was outsourced. It was later verified as part of a pre-processing familiarisation exercise leading to the data analysis process. Data analysis took the form of thematic

analysis (Braun & Clarke, 2006). One of the researchers performed the data analysis which was then passed on to the second researcher for a communicative validity check (Åkerlind, 2005). More than any verification of "correct" findings, the second researcher's scrutiny was to ensure that the thematic findings constituted a convincing interpretation emerging from the data set. The first stage of data analysis consisted of a first iteration perusing the transcript for devising descriptive codes. In doing so, the data set was mapped to an electronic spreadsheet inclusive of trail information to help keep track of each excerpt location in the original transcript. In the subsequent data analysis structured by 4 iterations sifting through the data, these codes were configured and reconfigured to form themes and subthemes so arriving at a representation of the event experience from the perspective of ERs. In reporting this resultant thematic representation, the ER participants are given pseudo-names. For traceability purposes, quotations are followed by the transcript page number (#n). The resultant description expands the preliminary picture obtained from survey data. As abovementioned, this latter part of the NL Forum 2021 evaluation study comparatively considering ER's expectations and experiences is presented by another paper constituting this symposium.

From the first stages of data analysis, 'learning experience' came to the fore as a strong theme. Data analysis iterations led to its configuration as a core theme binding all other constituent themes and subthemes. The 'learning experience' core theme is constituted by the primary themes 'event organisation', 'interactions', 'means of acquisition' and 'researcher challenges'. Each of these 3 primary themes are configured by 2 or 3 subthemes as elaborated in the next section. These first 3 primary themes promptly surfaced as strong constituent perspectives. The primary theme 'research challenges' was initially configured as a recurrent subtheme extending across the first 3 primary themes. Further data analysis iterations resulting in deepened discernment of its loading led to its configuration as another primary theme shaping the core theme 'learning experience' in describing the ERs' experience of the event. This theme was further explained by the subthemes 'researcher immersion', 'research skills' and 'personal traits'. Although analytically these elements were configured as separate subthemes, in recounted situated experience they mostly surfaced in combination. The next section shares the detailed thematic description of the ERs' experience of the NL Forum 2021 as it emerged from this data analysis.

Research Findings and Discussion

Overarchingly, the Networked Learning (NL) Forum 2021 event was described by the participating ERs as a 'learning experience'. As noted in the previous section on research methods, learning experience emerged as a core all-binding descriptor constituted by 4 primary themes each characterised by a number of subthemes. Table 1 below summarises the thematic representation describing the ERs' experiences of the NL Forum 2021 as configured by this qualitative exploration.

Core Theme	**Constituent primary themes**	**Leading subthemes**		
learning experience	*event design*	participatory approach	organisational features	
	interactions	discursive activity with others	access to experts	
	means of acquisition	accumulating resources	gaining insights and confidence	obtaining ideas and perspectives
	researcher challenges	researcher immersion	researcher skills	personal traits

Table 1: Thematic Description of the NL Forum 2021 Experience

Learning experience

There was unanimous agreement among the participating ERs that the NL Forum 2021 was "a learning experience" (Kelly: #5, Emma: #3), "training-like" (Cora: #1:) and "like an academic seminar" (Jeff: #11). Kelly also insisted that "the whole process was a learning process" (#2). These affirmations continued to arise through the whole course of the focus group interview. This finding agrees to the survey findings of the encompassing evaluation study of the NL Forum 2021 event. More than this, it concurs with results of other research studies identifying conferences and professional development events as learning episodes (Coryell & Murray, 2014; Davis, Fedeli, & Coryell, 2019).

Event design

Approach and features

The NL Forum 2021 as a conference-like event is claimed by the participating ERs as deviating from the customary conference they are used to. Cora claimed that the event had "*a new format*" (#1). Picking up on this idea, Kelly explained that "[we were] *learning together even though we're physically distant*" (#2). These assertions bring to mind Burford et al.'s (2018) conceptualisation of public pedagogy as an alternative to the traditional conference and its one-way communication strategy.

The participating ERs all referred to the forum giving them a chance to focus on their research and development. Cora reflected on how the participatory attitude "*encouraged critical thinking*" (#1). Jeff also declared that the use of break-out rooms in the public forum was an unexpected surprise (#4) as it offered the chance to engage in small group discussions with others. He stressed the extended opportunity to talk about his research with others as contrasting to what is usually experienced at conferences. The participants noted that the forum strayed from the traditional conference they are used to – which brings to mind the congregation of delegates silently listening to expert knowers (Burford et al., 2018). Emma explained the change "*with different activities … involving early researchers and even field experts to contribute to such an event*" (#5). Especially the relatively more experienced researchers repeatedly emphasised the participatory nature of the event giving participants a voice. Jeff observed that the forum brought together people with a shared research passion (#11). This calls to mind the 'shared interest' dimension of Etienne Wenger's (1998) concept of community of practice (CoP) and Jacob and McFarlane's (2005) claim that conferences lead to the formation of a reflective community of practice. The mutual engagement and joint enterprise CoP dimensions did not surface, but Cora avowed that the event fostered "*a sense of belonging to a community*" (11) in being with "*people who understand me*" (#9) and a sense of being with one's "*tribe*" (#9). The manifestation of a developing communal sentiment peaked at the end of the focus-group interview which was held straight after the closing of the forum. It brought about a flurry of recommendations for future similar events including a plea to consider a longer event duration, and a scramble to share usernames for remaining connected through social media platforms. This finding appeared to strengthen Jacob and McFarlane's (2005) proposition of conferences creating cohesion among participating attendees.

Jeff discerningly drew attention to the low ratio of early researchers and experts (#1) as a distinctive feature from the customary conference experience. In reaction to this observation, Kelly surmised that this permitted the one-to-one discussions with field experts (#2). Kelly also reflected on the opportunity of the coffee break in physical space furthering the potential of networking with more experienced others:

> "Even the fact that we could discuss one-to-one with an expert ... And being here, sorry for the others who are not here, offered us further support, even for example, a simple coffee and you share something" (#10).

Kelly's related experience of the coffee break hints at privilege of the physical space. Cora countered this idea pointing out that a shy person will not "*go directly [to an expert] and start conversing about this and that*" (#3). This issue is picked up again by Lister, Cutajar and Calleja (2022) in this symposium reflecting on the necessitated hybrid modality of the NL Forum 2021. These comments recall the complexity involved in thinking about the affordances of spaces and places (Carvalho, Goodyear, & de Laat, 2017). Bayne et al.'s (2020) outlook that "place is differently, not less, important online" may be a useful way for addressing this complexity. For this specific case it appears that the low ER-to-expert ratio combined to the opportunity of physical attendance served ERs to network with more experience scholars but generally not necessarily so.

The event's narrowed theme spread provided a better chance for the ERs to talk about personal research with others. Jeff compared the forum's "*narrow field of research*" (#11) with the vast range of topics you usually get in conferences (#2). This was different to what happens at typical conferences where the range of topics is huge making it difficult for delegates to interact with others with similar academic interests:

> "I would say to the younger researchers here that, that this is something extra. You don't get this much attention from typical academic conferences, because this is something else. And I think the biggest threat in a normal conference is ... I think structure. And you don't meet any people who share the same interests with you" (#11).

The forum's restricted focus coupled with a participatory approach served to create a space for meeting and interacting with people with similar academic interests (even transcending the hybrid nature of the event and the Covid19 restrictions leading most of the delegates to attend remotely). Cora refers to "*this world of people who understand me*" (#9) and having "*an access to people with whom I can talk about that [technology enhanced*

learning and networked perspectives]" (#10). In general, the event organisation with its strong participatory attitude incorporating elements to facilitate interactions with others who share the same academic interests surfaced as a primary descriptor of the NL Forum 2021 learning experience. However, as discussed in the next section in relation to the primary theme 'interactions', the human factor is crucial for setting off these sought-after academic conversations.

Interactions

Discursive activity with others, access to experts

Participating ERs put particular emphasis on interactions with others and access to experts. The interactions with peers and experts for the case of this forum were claimed "*fruitful*" and "*deep*" leading to "*reflecting much*" (Cora: #1) and "*a very thought-provoking experience*" (Emma: #5). They give reason to Falkunle et al.'s (2019) claim that the possibility to network with peers and experts highly motivates ERs to attend conferences.

Especially the relatively more experienced ERs, who disclosed that they have been engaged doing research and presenting at conferences for some time, elaborated on the significance of discursive interaction with others. Cora described these interactions as an opportunity to develop "open-mindedness" (#3) in seeing the perspectives of others and broaden one's knowledge horizon:

> "learning about things you're not used to, sometimes opens your horizons as well. So the idea of networking even online with other people from around the world who joined us gives you the idea that you're not alone (Kelly: #2).

Jeff also reflected on the opportunity to engage in discursive activity with international others. Coupled with the narrowed focus of the forum, permitted ERs to interact with peers who employed different research approaches. As newcomer to NL, Kelly disclosed that the discursive activity with peers helped her understanding of the field:

> "I was open to any opportunity that would come by and even learning … being here with you all and sharing in the breakout rooms ... the way we discussed somehow offered a fruitful experience" (#5).

The access to experts featured strongly in what was shared by the participating ERs during the focus-group interview. Numerous times, the ERs referred to the possibilities the forum gave them to talk directly with field experts. Kelly and Cora discussed practical alternatives including a consideration to increase the time allotted for the 'Meet-the-Expert' activity permitting the ERs one-to-one conversations with each of the attending experts:

> "maybe a roster could have been created and we could have visited another expert." (Kelly: #11).

And as Cora put it "*if you have such a unique opportunity, you would like to discuss everything with an expert, to grab the expert and not to let him or her go*" (#6). Clearly, participating ERs of the NL Forum 2021 greatly valued the access to experts.

Means of acquisition

Resources, insights, ideas

During the focus-group interview, there was a pronounced general consensus among participating ERs on the possibilities to discuss their work and receive advice in informal ways, to obtain ideas, insights and resources.

ERs expressed appreciation of the forum serving them to obtain papers, references, and ideas. Cora underscored "*how many resources were shared during our two days. A lot of papers. A lot of references. A lot of ideas*" (#1). Kelly highlighted that the experts participating in the forum were open and willing to share their knowledge and expertise with participating ERs. Jeff disclosed that he was inspired to do better in the future considering the remarkable presentation of a fellow ER. Three of the participating ERs also declared that they accumulated knowledge on NL as a study theme as well. For example, Emma declared:

> "I learned more about networked learning and how this can be applied to different scenarios, whether you're a researcher or maybe you are in a different position" (#2).

Participating ERs agreed that the forum permitted them to gain insights from experts and the assembled group of international peers (and other delegates). Jeff picked up on the appeal of a keynote for "*seeking the cracks in the*

system" (#4). Closely considering the three keynotes and bringing them together as different perspectives of NL, Cora concluded that:

> "these three presentations, were really an eye opener for me. So the first one about activity channels, the second one about critical approach to networked learning and about the program how networked learning principles can be deployed right at institutional level" (Cora:#3).

Especially the relatively less experienced ERs drew attention to the opportunity to present research to an unknown audience and the emotional gain seeing for yourself that others are interested in your work:

> "One of the biggest things that inspired me and gave me more confidence was seeing that people are at least somewhat interested in my topic and what I researched and people had questions, had interesting takes on it" (Ben: #3).

Hinting at a broadened understanding of knowledge, Kelly succinctly summarised the forum as a means for intellectual development:

> "It creates this idea of cognitive conflicts ... it makes you reflect what to do with all this knowledge that you've gained from the experience and the experience of others. It could be considered as a challenge to keep you going" (#8).

Researcher challenges

Immersion, skills and traits

The forum's special focus on ERs inviting researcher immersion did not arise so much as a direct object in the focus group interview. Mostly it surfaced as a subject coming across in challenging issues and encounters recounted. The clearest direct statement was Jeff's admission that "*focusing for two days it's also a little bit mentally stressful*" (#1). Cora was less forthright in admitting that "*two days but I have a feeling that was longer than two days because the discussion was so deep*" (#1). Arguably, researcher immersion was negatively and positively experienced as a challenge.

There appears to be unanimous agreement among ERs that the most challenging activity of the whole event was the one-to-one meeting with an expert. This activity took place during the closed researchers' meeting. According to Cora, choosing an expert after listening to the three keynotes was problematic because when you "*resonated personally with different aspects of their research and the theories they presented … that was challenging to choose one person*" (#6). For Cora the limitations of gaining access to experts is challenging. It is disappointing for an ER to first be offered this unique opportunity to discuss her research with field experts she has been reading and then constrained as to whom she can consult with and for how long:

> "that was challenging to choose one person ... The second challenge was to choose one or two questions, because if you have such a unique opportunity where you would like to discuss everything with an expert ... And there's a challenge, time limit, 10 minutes, and we were thrown out of the session room" (#6).

For a less experienced ER, the one-to-one meeting with experts also led to a problem on the kind of questions to ask: "*for example, should we ask general — more career advice, or maybe, advice about the research specifically as well? I had that question as well*" (Ben: #9). The loose structuring of the activity permitting ERs to prepare their specific set of questions to ask without any further direction created different kinds of uncertainties. Despite acknowledged experience attending conferences and presenting research to international audiences, Jeff confessed that he remained uncertain to the very end about choosing an expert with whom to discuss his work.

Interactions with others did not always work out. An ER recounted the occurrence of a dysfunctional discussion group during one of the breakout room activities during the public forum. Ben reflected that this might be due to participants being "*more introvert or shy to speak*" (#4). Evidently the pre-set discussion question was not always enough to spark off the intended conversation. This incident emphasises the cruciality of facilitation (Garrison, 2017; Salmon, 2004) even in public events such as this hybrid international forum going beyond the confines of discussion conferences in formal learning settings. It substantiates recent literature on technology mediated conferences (Haji-Georgi et al., 2021; Rubinger et al., 2020) stressing the need for detailed planning along with plans for interactions.

Emma also called attention to the challenge of presenting research work to an unknown audience (#7). For inexperienced presenters this issue is a reality. Extending on the issue of unknown audience, Kelly reflected on the difficulty interpreting the feedback provided from unknown delegates (#8). In consideration of research presentations in the public forum, the more experienced doctoral researchers, focused mostly on the capacity to succinctly and clearly communicate the research. For example, Cora saw value in the limited presentation time: "*That helped us not to be too wordy about our research, because we can talk hours about our favourite topic*" (#1). She referred to the importance of developing researcher skills:

> "to be extremely focused on the most important aspects ... you should step back and look at your slide and to see just what are the most important aspects that I would like to articulate that you would like to present as a message to your target audience?" (#1).

Ben confessed that Cora's comments gave him a new perspective for looking at the researcher challenge "*to be concise*" (#9). The capacity to communicate your research work succinctly is a challenging researcher skill.
There was unanimous agreement among ERs that the public forum presentation was a challenge demanding researcher presentation skills, but not only. Jeff and Kelly noted challenges relating to information management and academic writing skills. For example, Jeff revealed that the substantial email correspondence added to the onus of a busy work schedule. Kelly felt challenged by the unfamiliar submission requirements:

> "we had to write two abstracts and I couldn't understand why the long one and the shorter one, and now I understand why. But most probably you need it for the programme but at the beginning, that was a challenge for me to try and write … However, as Cora was saying, sometimes it helps you focus even further" (#2).

As highlighted by some of the shared quotations, researcher skills emerged as a prevailing structuring aspect including academic writing skills, information management skills, research presentation skills, skills connecting to unknown audiences and interpreting academic feedback. There is called to attention the need for conferences and similar events intending the involvement of ERs to be especially sensitive supporting researcher skills development.
Especially on personal traits, Emma declared that as a researcher one needs to overcome shyness to join in conversations (happening in a conference-like event like the NL Forum 2021). Reflections shared by other participating ERs, such as Ben's comment earlier, express the same sentiment of shyness and possibly introversion as personal traits. Ben and Cora also pointed out that inexperienced researchers may hold back from actively participating in discursive activities during such academic events because they perceive others to be more knowledgeable. This finding corroborates Campbell et al.'s (2021) claim about their graduate students appraising their personal knowledge compared to other conference delegates. But rather than emphasising the learning benefit this study highlights the ensuing participating ERs' challenges. The challenge of productive participation in academic conferences may be further exacerbated for ERs coming from traditional educational institutions where teaching and learning is top-down, accentuating power in expert learner relationships.

Concluding Remarks

This emerging description of the NL Forum 2021 experience from the perspective of participating ERs confirms it as a compelling, participatory, learning event bearing academic advantage. Generally, this description of the ERs' experience of an international academic event corroborates earlier findings. Distinctively, this exploration shows academic benefit melded with researcher challenges fashioned by researcher immersion, research skills and personal traits.
But this emergent thematic picture is based on the single case of the NL Forum 2021 and a small research participant cohort. This renders the research outcomes very limited in scope. Further research is needed to verify these findings. Meanwhile, it is reasonable to heed the recommendations made by the ERs of this study demanding similar future academic events making it possible for inexperienced researchers to connecting with international peers and expert scholars for academic research development. Such academic events which are ER-centric facilitate beginning researchers to present their research to an international audience within a relatively less intimidating environment compared to typical international conferences which are much larger and wider in scope. They provide a space for beginning researchers to be challenged in developing research related competences and grow emotionally as researchers. It also makes sense for organisers of large-scale, international, conference events welcoming inexperienced researchers to pay attention to event design details providing additional support to

researchers who are taking their first steps being part of a learning community for the advancement of knowledge, the development of related practices, and value creation.

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Reflections on Hybridity in the Malta Networked Learning Forum 2021

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Abstract

This paper discusses the practicality, successes and possible failures of the Malta Networked Learning (NL) Forum held in May 2021. The forum was held in a hybrid synchronous face-to-face and virtual context, with a wide range of international participants, planned at short notice due to continuing uncertainty of Covid-19 restrictions. The paper outlines contexts and understandings of hybridity in both events and pedagogical approaches, noting varying definitions and concepts that may utilise this term to indicate forms of barrier breaking, overcoming limitation or supporting flexibility. Further context highlights recent literature concerning other digitally hybrid conference events, the need for which have been accelerated in light of the Covid-19 pandemic and additional considerations of climate change for reducing the carbon footprint of academic communities. Discussion leads to the type of hybridity implemented for the Malta NL Forum in May 2021, where pandemic international travel restrictions, local regulations and participant planning uncertainty required the adoption of a face-to-face and virtual synchronous event. The local organising team (authoring this paper) provides commentary to critically reflect on the strengths and weaknesses of the modality adopted. Emphasis is placed on designing for hybridity in future events, to improve planning and organisation for flexible and agile awareness to support the full range of participants in hybrid contexts and activities. The paper attempts to support those whose role is to convene and host similar events aiming to foster rewarding engagement for those participating, both presenting as well as attending.

Keywords

conferences, networking, hybridity, online, virtual, covid-19

Introduction

Academic conferences may be considered a significant aspect of the academic way of life (Sá, Ferreira & Serpa, 2019, p. 37), associated with international knowledge and research partnerships, professional community building and social networking, with other perks such as international travel subsidised by academic institutions. These events may be considered as "privileged spaces and moments for the dissemination of new … knowledge, as well as for social interaction… for the establishment and development of social networks" (Sá et al, 2019). As Sá et al. describe, academic conferences have most often taken place in face-to-face environments, however more recent events have increasingly been held in virtual or hybrid modalities owing to restrictions imposed by Covid-19. These may have indeed now become the 'new normal' (Karunathilake et al., 2021), with attendant advantages and disadvantages of participation cost, environmental footprint, equity of participation and issues of digital literacy or technological accessibility (e.g. Donlon, 2021; Carrigan, 2021; Flaherty, 2021).

Conference modalities may vary, from entirely virtual to ad-hoc mixtures of face-to-face and virtual sessions, and can depend on location and available broadband provision of the host institution as much as topic and duration of conference event (Falk & Hagsten, 2021). Conference sessions arguably have much in common with most conventional large lecture environments, and "require relatively simple substitution" for presentational practice, typically achieved using video streaming technologies such as Zoom (Cochrane et al., 2020). However this may not plan beyond initial concepts of the presentation, the presenter and the audience. Once an event moves into discussion rooms, with smaller concurrent group sessions based in prior presentation topics, things may become more complicated (Karunathilake et al., 2021), though others see virtual events as more advantageous to discussion possibilities (e.g. Hanaei et al., 2020).

The question posed in this paper is how well the Malta NL Forum coped with the hybrid, partly digital, partly face-to-face synchronous modality in order to achieve a participatory event that encouraged both presenters and attendees to contribute to conversations and outcomes of the event.

Contexts of hybridity

Defining hybridity

Hybridity as an umbrella term denotes the coming together of distinct states in creating a new state of being (Nørgård, 2021), or "ecotones" (Ryberg et al. 2018). For example within pedagogical contexts, teacher presence and learner presence merging into a hybrid presence (e.g. Nørgård, 2021; Koutropoulos & Koseoglu, 2018; Cochrane et al., 2020; Saichaie, 2020). In the realm of the academic conference event, hybrid conferences have been defined overall as a blend of virtual and face-to-face, including both online and 'real-world' attendees and presentations (Falk & Hagsten, 2021; Jones, 2008).

Prior to the Covid-19 pandemic, in studies (e.g. Fraser, Soanes, Jones, Jones & Malishev, 2017) or related past literature (e.g. Siemens, Tittenberger & Anderson, 2008), virtual and hybrid conference events are often discussed from the perspective of equity and accessibility, as they provide "multiple options for cost and involvement" (Jones, 2008), and extend dialogue "beyond barriers of time, space, and related cultural variables (Siemens et al., 2008). Fraser et al. describe several variations of a hybrid 'hub and node' model based around the principle of a host institution (or several institutions spread across time zones) with "virtual conferencing equipment, internet access and power, and fixtures for a smaller, in-person conference, such as a traditional conference hall, refreshments, and communal areas" (2017, p. 543). This essentially describes what may occur in general ways in any hybrid blend of virtual and face-to-face event, and as such was implemented at the Malta NL Forum in May 2021, further described in subsequent sections of this paper.

Issues relating to sustainability and the generated carbon footprint of international conferences is a prominent discussion in contexts of virtual or hybrid conference advantages. As far back as 2008 Jones comments on a 'sustainability decision making protocol' for the best use of natural resources, asking "(d)oes the conference minimize kilometers traveled? Can the conference maximize use of renewable energy sources?" further noting the target to offset 100% of carbon dioxide emissions and 50% of electricity from renewable energy sources (2008, p. 2). Fraser et al. (2017) remark on the irony of sharing conservation research findings by attending international in-person conservation conferences that generate high carbon footprint cost, as "by flying to international conferences, researchers contribute to one of the biggest long-term threats to biodiversity - climate change …" (2017, p. 542). Clearly, the increased prominence of climate change debate across all fields of scientific and humanities based research, including education, may indicate that the 'new normal' of virtual or hybrid conferences (and perhaps even other aspects of working and educational life) may be here to stay.

Within learning and teaching contexts, hybrid pedagogy has become a more commonly used term in recent years to describe the various approaches to learning and teaching for both formal and informal learning. Pedagogical discussion of hybridity in Stommel (2012) centres around the "relationship between bodies and technology" and that "our flesh is made intangible in the digital age….". Stommel expands his definition of the word "hybrid" as having "deeper resonances, suggesting not just that the place of learning is changed but that a hybrid pedagogy fundamentally rethinks our conception of place" (2012, para 5). Prior to Stommel's ideas, Pachler, Bachmair & Cook (2010) defined hybridity in terms of the structure of a curriculum, that according to Young (2006) included the crossing of disciplinary boundaries; the incorporation of everyday knowledge and the involvement of non-specialists in curriculum design. They saw hybridity in terms of what was being learned and how it was learned rather than any involvement (or not) in implementation and use of technology. However, Cook and other co-

authors continue in more recent work (Cook et al., 2016) to consider hybridity as having two dimensions: (i) a hybrid combination of formal and informal social structures in an activity system … (i.e. in terms of structural relations of the power and control in institutional and cross-institutional settings), and (ii) a hybrid combination of physical and digital tools; how cultural-historically developed tools (physical and digital) mediate the individual's relation to the world where the competence to handle such tools is acquired in social settings through guidance from other persons or guidance from digital tools in a "50-50 partnership" (2016, p. 124). These concepts are briefly explored later in this paper in relation to how they may impact the participation of a hybrid conference event such as that of the Malta NL forum. Cochrane et al.'s (2020) work examined how to rethink the hybridity of design in learning environments for practice based learning. Practice-based learning does not easily transition to online learning using the one-to-many large lecture model of lecturer Zoom presentation to many viewers. One of their key points to support rapid redesign of this kind of learning is to consider "Remote to Hybrid Learning: using digital to amplify, accelerate and connect learners globally", to facilitate distributed learning communities that may be present in smaller groups at real world locations. This echoes the concept of the hybrid conference, where small group discussion co-constructs understanding and shares knowledge, yet some members of these groups may be attending and participating virtually. Of note, more recent work in hybrid learning spaces worthy of further investigation has been published at the time of writing in Gil, Mor, Dimitriadis & Köppe (2022).

Focus in this paper is the amalgamation of face-to-face and online modalities participating in larger and smaller group events within the Malta NL forum. While one keynote presenter was physically attending in the host venue, other keynotes were attending virtually via Zoom. This arrangement also applied to other presenters from the attendee groups, where some early researchers were present physically at the host venue, while others presented virtually, again via Zoom. We use the term 'early researchers' (ERs) rather than the prevalent early-career researchers (ECRs) to distinguish between graduate and doctoral level researchers attending the NL Forum 2021 event, rather than the 'doctoral and postdoctoral' category to which the term 'early career researcher' more commonly refers to (McAlpine, Pyhältö, & Castelló, 2018). Breakout sessions where topic discussion took place additionally included both face-to-face and virtual attendees in various synchronous sessions, which posed further challenges discussed in subsequent sections of this paper.

Hybrid events and conferences

A growing body of literature examines hybrid academic events for overall advantages and disadvantages, particularly from perspectives of efficacy, equity and sustainability. Sá et al. (2019) carried out a comparative analysis of several different types of modality, also highlighting problems inherent in the conference system *per se*. Citing others, they state "the importance of conferences and participating in them in the visibility, consolidation and expectations is undeniable both at the professional, institutional and personal levels" (2019, p. 37). However, they follow with some problematic areas inherent in the academic conference system, such as the reaffirming of academic hierarchies and inequalities that may be present in event structures, drawing attention to issues of 'gender, race and social condition' (p. 37). Further citing Verbeke (2015), that "conferences can and should be sites and moments that foster the active building of knowledge among participants", they offer Sköld's 2012 work on the nature of the virtual space, and relationships to physical space, virtual space architecture and socio-cultural impact to foster effective learning. In terms of relevance to this paper, Skold notes that "virtual space affects our perception and understanding of physical phenomena …", the inherent "biases of virtual learning spaces", and "(v)irtual space is culturally, politically, and socially biased" (p. 38). That is, virtual space is not neutral, impacting perceptions of both virtual and physical presence, either separately or as an enmeshed whole, though we recognise the same can be said of real-life spaces.

Falk and Hagsten (2021) make multiple sentient points that describe the current terrain of the pandemic drift towards embracing hybrid or exclusively virtual conference formats. Their accurate accounting of the complex planning and flexible organisation required of host institutions and convenors reflects the challenges present in virtual and hybrid events, also reflected in the Malta NL Forum event. Of various advantages (time zone/pre-recorded sessions, limitless numbers of attendees, access for poorly funded country nationals), Falk and Hagsten then point out that "(o)ften, a large part of the networking at conferences takes place during coffee breaks, in corridors or at the organised dinner", that sometimes entire research projects have emerged from. They also cite Fraser et al. (2017), who conclude that a main limitation of the purely virtual conferencing model is that it cannot replicate face-to-face networking (p. 545). While noting there are various advantages of attending events virtually (such as those outlined in Siemens et al., 2008), this limitation may also be true of some hybrid event models. For example this might be where only face-to-face attendees have coffee and discuss the presentations they have just attended, yet virtual attendees are left in isolated vacuums. While back-channels may be considered as a possible

way to enhance community building and social networking in virtual and physical events alike, invisibility, disregard or unfamiliarity may lead to isolation and alienation, e.g. in Spilker, Prinsen & Kalz, (2019). Spilker et al. cite various other work to highlight issues around use of Twitter as a backchannel of communication and networking. For example, there is a higher rate of communication between similar people than among dissimilar people, challenging the hypothesis that Twitter may be an opportunity for young researchers to become actively engaged with the research community (2019, p. 7). The issue of diversity is again raised, that attendees of conferences (with various levels of expertise and professional experiences) are often examined (or planned for) as a homogenous group, not considering, for instance, the influence of gender on conference attendance (p. 9). Additional socio-cultural differences such as time zones, or emergent power differential structures including inherent academic hierarchies may also impact how backchannel social media can effectively provide an adequate platform for 'off-schedule' communication, knowledge sharing or network building.

Technological mediations in hybrid events

The impact of technological mediations on participation in hybrid events and the perceived value and usefulness for those taking part can take a variety of forms. These can include technical limitations of host institutions and individual attendees (Sá et al., 2019; Fraser et al., 2017), digital and media skills and competences of presenters and participants (Duruwala, 2020, p. 12), and the prior assumptions, expectations and predilections for choice and use of digital devices and technological processes. Access to suitable technology and reliable broadband provision can be problematic barriers not only for host institutions but also for participants (Jacobs & MacFarlane, 2005; Falk & Hagsten, 2021). In similar ways to cost and funding this potentially limits some institutions from hosting and some participants from attending such events, therefore hybrid (or exclusively virtual) events may not be as equitable as is indicated in prior literature such as Siemens et al. (2008). Siemens et al. raised other prescient points about online and 'Simultaneous-Blended Conferences', arguing that for example "use of podcasts, wikis, and blogs to promote conference events is not an overly challenging task" (p. 22). Nevertheless, others argue that digital skills and literacies are still patchy at best and the digital divide is deepening (e.g. Van Dijk & Van Deursen, 2014).

Prior expectations or attitudes towards technology - bias, *technophobia* (Brosnan, 1998), general prior experience - of virtual or hybrid past events or learning and teaching experiences may influence the efficacy and value of the hybrid conference for an attendee. Brosnan remarks in his opening chapter that "(t)echnology is everywhere. It is ubiquitous in work, home and leisure environments…", and that "avoidance of new technologies by certain individuals has led to suggestions of the existence of a 'technophobia' …" (1998, p. 10). In 2021 similar concerns may still manifest variously in relation to hybrid conference events. Technological determinism positions use of technology as a prerequisite to professional practice (Hinrichsen & Coombs, 2013), yet computer anxiety, lack of confidence or other negative associations persist (Duruwala, 2020, p. 16), and perhaps should not be associated with "pathologizing of the individual nor diminishing the validity of resistance" (Brosnan, 1998). Being a 'luddite' (Hinrichsen & Coombs, 2013; Stommel, 2014) towards educational technology or technology in general may impact attending virtual or hybrid conferences. However, it may conversely be argued that if one is disinclined to be overtly social in 'real life' then a conference may be an intimidating environment and would be avoided by those not wishing to engage in face-to-face contact. Implications are that a mix-and-match approach to academic events might prove the most useful to the most people, indeed perhaps deserving of further research.

Hybridity and sense of place

Physical places may have disadvantages too. Practical problems of hard to reach locations, travel problems, inadequate funding, limitations of facilities or other issues at host locations (e.g in Fraser et al., 2017) may limit who can attend as well as who can host. In hybrid events, individual attendee physical presence context can also impact quality of experience. What does it mean to attend a hybrid event with attendees from multiple remote locations and personal (individual physical presence) contexts? The experience of 'being' at an event, senses of presence in intertwined environments: physical real-time presence; digital, virtual 'telepresence' (Steuer, 1992; Jones, 2015a, p. 91); socio-cultural glocalities (Meyrowitz, 2005), multiple time zones, languages and personal commitments. These real-world and virtual spaces, competing senses of where one 'is', and how to perceive and interpret sensory input in order to convey meaning or share understanding become entangled challenges in contexts of the hybrid academic conference. Technology mediates participant experience between these multi-layered and intertwined terrains, in cognitive, cultural, social and affective intra-active (co-constitutive) relationships of awareness, communication, learning or value, mingling with externalised physicality of light and heat, buildings, peers and the real-world and virtual conversations going on (e.g. Pyyry, 2017; Barad, 2007). Traxler's (2015) description of 'the erosion of physical place' by "multiple mobile virtual spaces of multiple conversational interactions" is termed as 'absent presence'. These "physically co-located groups of people all connected online

elsewhere" partially describe some of what occurs in hybrid events, though periods of digital presence are shared, "(p)hysical space in fact is emptied of significance, becomes less dense as thickness, as the dimension of virtual space is grafted on to it" (p. 198). These differentiations between 'place, space and presence' offer a mechanism of articulating how these fragmented areas of cognitive awareness compete for attention, 'replacing a solid stable spatial context' (p. 197) with a context where potentially "people emotionally and intellectually absent themselves from their shared physical location" and "others, people physically elsewhere, are now virtually present" (p. 197-198). He further reflects on "temporal and spatial contexts as some kind of resource or raw material (spatio-temporal capital, perhaps, or space-time as a commodity)" (p. 199), which may be a way of considering how attendees divide their attention, focus and energy directed at differing digital and real-world domains as their interest or motivation to contribute is sparked.

It may be that by assuming barriers are created in human experiences of presence in place when technology mediates those experiences (particular in learning contexts), we attach undue value to human presence *per se*. As Lewin remarks, "many educators speak for the uncanny quality of physical presence; that being physically face-to-face with students has a singular, irreducible pedagogical power" (2016, p. 253). Lewin further observes that this position is a "binary that takes online education to be existentially disconnected in contrast to an educational norm …*(that)* … rests upon the presumption of a pre-technical human that has never existed" (p. 258).

The Malta NL Forum Event

Following discussion provides the first hand experiences and reflections of the host team. This describes 'what actually happened' scenarios and how host conveners felt about what they did and how it may have impacted both the event as a whole and individual attendee experiences. The effectiveness of the event is reflected on from the perspective of the event's overall aims of seeking to offer useful and relevant keynote and ER presentations, to encourage a full and interactive participation from everyone. Support was especially focused on the ERs attending the event, however those attending the event were drawn from a variety of academic professional backgrounds.

The Malta NL Forum hybridity reflections

The Malta NL Forum was at the start planned as a physical event to be held at the University of Malta (UM) Valletta campus. When the forum was conceptualised soon after the biennial Networked Learning Conference 2020 it was not envisaged that the Covid19 pandemic would continue to disrupt travel and public events for a considerable period of time. As the date of the event drew nearer, it became increasingly clear that a fully on-location event was not possible. The final decision of a hybrid event was taken about a month before the event. For the actual event, most attendees joined online. The still very strict local Covid19 restrictions sparingly permitted the host team and two participating researchers to be on location. The local keynote also came in person to deliver his presentation but otherwise also attended the forum from a distance.

The hybridity facilities of the UM Valletta campus at the time of the NL Forum allowed for Zoom-based online meetings running on the resident conference room computer. A technician was in attendance all through the event controlling and overseeing the digital operations including the recordings of the forum sessions. The live meeting was streamed on the two huge display screens covering most of the front wall of the conference room. On location attendees were provided with desk digital microphones that could be switched on and off as needed. As on location attendees we were advised to also join in the online meeting from our personal computer but to keep microphones muted. The unfamiliar set up led to what one of the host team members described as awkwardness. She found herself frequently shifting from looking at the big wall-mounted displays to her small laptop screen. This was felt as if it was leading to a situation worse than talking to others from across the screen. It led to instances where she felt as if she was looking the other way instead of at the people she was talking to, or who were talking to her. An alternative was to simply turn off the camera of the personal computer but this would have led to total dependence on the technician who was controlling the streaming sessions. Besides, it felt contradictory to be switching off her camera when at the same time she was encouraging attendees to keep their camera on where and when they could to help create a sense of togetherness. Moreover, switched off cameras underscore the remote connectivity. Perhaps as hybridity becomes a mainstream modality option for conferencing events and study-course meetings, we need to rethink hybrid spaces to provide a more seamless across-space experience for all attendees. The current trend of institutional purpose built hybrid classrooms have additional cameras to provide a live visual from the back of the room and 'intelligent' microphones that filter out noise other than that of the speaker (mostly the orator at the front or in close quarters to it). However this is not enough to give a sense of a merged spatial presence of the offline and the online and leads to another unsettling issue that event hybridity raises, of potentially creating barriers between virtual and 'real' attendees.

Hybrid modality runs the risk of a them-and-us mindset. The on-location presence may be easily interpreted as a place of privilege (Bayne et al. 2019). Hybridity brings this problem of otherness more to the fore. Different spaces are not in hierarchical order of privileges (see our earlier discussion highlighting hybrid institutional social structures and physical/digital contexts in Cook et al. 2016, p. 124). Our limited imagination of how the digital may serve to bring down the barriers of distance needs to be taken more seriously. It is more useful to consider the different spaces and the digital technologies we have at our disposal as offering diverse ways of how to float within and across alternative spaces and moreover, places and presences. Rising above dichotomies in our thinking may help us better to see possibilities and alternatives of hybrid ways of being. This leads to another contentious issue that hybridity raises, of virtual and face-to-face communication in hybrid event discussions, particularly in the context of breakout rooms.

Hybridity and 'breakout' discussion rooms

Another host team member was in charge of managing breakout rooms. Breakout rooms were intended to engage attendees in discussions over questions posed by keynote speakers. Such spaces were thought to offer opportunities for 'more focused' interactions among a small group of not more than five participants. However, for some groups, interactivity appeared to fail. In at least two of the ten breakout rooms, participants did not even introduce themselves to the rest of the group. It appeared that no one was ready to take the initiative to start, as if they were unaware of what they should be doing. We think this happened for a number of reasons. First, there was a lack of explicit planning for how breakout rooms were managed so as to provide guidance, to put attendees at their ease when they entered an assigned breakout room. For example, interactions could have been enhanced had breakout rooms had attendee facilitators assigned to lead and facilitate the discussion. A second issue related to an Internet connectivity problem that inhibited the person managing the breakout rooms to attend to the initial challenges that participants faced. As a result, he had to quickly juggle work using a second laptop through which he had to request host permissions options in order to have access to all breakout rooms. This, of course, took some time (about 5 minutes) to settle. Without immediate support some members in at least two of the breakout rooms simply gave up and no discussion ensued.

A third issue related to the role that this host team member had in order to supervise and support breakout room discussions. One key issue seemed to be whether the sudden appearance of the host in a breakout room could be seen by the group as an interference, and, rather than viewed as an observer and helper the host seemed to be seen as an invader of a 'safe' interactive space. Each time the host joined a breakout room (virtually) discussions appeared to cease. It seemed that as soon as the host appeared on screen, his presence interrupted the discussion and participants stopped to listen to whatever he had to say. Rather than facilitating the process, this 'stepping into' a breakout room appeared to halt interactions and participants exhibited confused looks. Subsequently, the host's intervention - that the reason for joining was simply to check that 'everything was going well' and to make sure in case the group needed any help - seemed superficial, late or unnecessary. This presents similar challenges to those in a conventional classroom where the teacher seeks to establish informal constructive relationships with groups of students as they work on a problem. Though the context of their discussion is the science classroom, Taylor, Fraser, & Fisher (1997) alert us to the relevance of critical theory, which focuses on the classroom as "a socio-cultural site that legitimates, often in subtle and unannounced ways, key aspects of the social learning environment". Citing Herbamas' (1978) 'practical interests' in this context, they highlight these as being "concerned with establishing *open discourse* in which teacher and students act communicatively for the purpose of establishing rich mutual understanding. Conditions for open discourse include an atmosphere of trust and mutual respect and a commitment (by teacher and students) to disclose valued ideals and beliefs", going on to state that this can also be disempowering "to the extent that understanding is framed by invisible ideologies rooted in historical taken-for-granted practices that perpetuate social injustices such as gender inequality, silencing of voices, and culturally exclusive practices" (Taylor et al., 1997, p. 3). Noting our prior discussion in this paper regarding perceived hierarchical structures of academic conference attendees, online or hybrid discussion and facilitation may be a complex consideration to acknowledge in planning a hybrid activity such as the Malta NL Forum. On a purely practical level, it is also worth mentioning that an additional drawback of using breakout rooms in such a hybrid event was that those who were physically present had to change rooms (physically), seeking a quiet place to listen and speak undisturbed. We think that while the breakout room feature is intended to offer the opportunity for discussion, it may also inhibit this purpose if it is not well designed in all respects to address the challenges outlined above.

The need to design for hybridity

Hybridity therefore merits to be designed for. The Malta NL forum 2021 was originally designed as a physically located event. The coercion of the pandemic crisis and related restrictions led to the event being turned into an online space. The departure of the activity design rooted in physical space meant a lost opportunity to think through a hybrid event design. The same would have been the case had the event design departed on the premise of a fully online event. In retrospect it is noted that the dedicated Twitter hashtag concocted in the run up to the event, intended to provide an alternative back channel for participants to connect collectively in small group and on one-to-one basis, did not take off. The reasons for this may be various, noting earlier discussion in this paper relating to the work of Spilker et al. (2019). A design approach specifically targeting hybridity would have potentially served to help create a seamless event for all. Perhaps, this would have not elicited the innocent comment of one of the on-location participants that those present in physical space had the privilege of informal learning conversation during the coffee breaks and those pockets of unstructured times when attendees can reach out to each other to connect and network.

In consideration of hybrid modalities and presences for learning and networking we need to be more sensitive to different possibilities of access for both those who are in physical presence and those who join in remotely. As per our comments earlier reflecting on what hybridity is and entails, we cannot assume that all involved have the same accesses. We admit that the practical necessity of quickly shifting an intended physical event to a hybrid modality would have benefited from more detailed thinking and planning, rather than adopting what might appear as a simplistic techno-solutionist (Jones, 2015b, p. 126; Morozov, 2013) attitude. .Whichever way participants joined in, the kinds of devices used, individual assumptions, presumptions and understandings about digital technologies for learning and networking, and the digital skills and literacies, all impact on the individual and collective experiences created and co-created. Preparation for these hybridity continuums should acknowledge the haves and have-nots across all the spaces, places and time regarding different kinds of access. This continues to emphasise the need for hybridity of conference events or other learning contexts to be designed for, while acknowledging that face-to-face conferences themselves may not recognise and plan for all these factors.

Conclusions

In conclusion from these reflections we are seeing that hybridity demands of us to consider it not as an extension of the physical or virtual space, but a space in its own right, and as a merged space in its own right. So firstly it merits a targeted design. Secondly in considering the whole context of the hybridity instance, it is more productive to let go of otherness but think of opportunities and challenges in the matter of choices. Thirdly, we need to take a step back to seriously consider the situational availability of digital resources and seek to think beyond our blinkers of past experience and current knowledge; also open to possibilities considering the fast-paced socio-technological advancements in the world around. In summary, in going for hybrid modality for learning and development we need to rethink design, facilitation and the human (and non-human) possibilities for interaction within and across spaces which traditionally were conceptualised as distinct but which with hybridity are coming together into a merged space of alternatives.

Going forward, the potential ‘new normal’ of hybrid conferences may sometimes be ‘the most useful to the most people’, considering aspects of cost, funding, equity, accessibility and sustainability, notwithstanding the limits in terms of sociability and professional networking. It is indeed possible that face-to-face conferences are preventative to attend for some in academic communities, and reasons for this may have been further exacerbated in light of ongoing pandemic restrictions. The efficacy of hybrid events may depend on more careful planning and design, for the academic discipline, purposes, and for the benefit of all attendees.

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SYMPOSIUM 5

Applications of networked learning to the support of learning and teaching in higher education

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Introduction

This symposium is the result of a broad effort by the authors to consider the applicability of networked learning to our work to support learning and teaching across our institution. We, the authors, work in a central learning and teaching support unit within Auckland University of Technology (AUT), in Auckland, Aotearoa/New Zealand. We are concerned with how networked learning is applicable to our efforts to support learning and teaching at AUT-specifically- to operationalise the institution's strategic commitments to learner success. Our focus on supporting learning and teaching operates at various levels, from the 'local' level of individual courses to the intermediate level of supporting degree programmes to the more 'global' level associated with developing institutional policy that supports effective academic teaching practices and the ongoing evolution of a technology infrastructure that enables and supports productive learning and teaching activity. Moreover, our work deals with questions and challenges which range from specific, situated practical challenges to broad, philosophical questions which affect learning and teaching across the institution. This symposium represents our efforts to synthesise our understandings of networked learning and connect general ideas about networked learning with specific, situated aspects of our work to support learning and teaching across the institution.

Early in our discussions, we identified the underlying assumption that networked learning is seen as a 'good thing' and the associated idea that engaging educators at AUT in networked learning was presumed to be worthwhile for reasons highlighted in the growing body of literature related to networked learning, including:

- Valuing certain types of collaboration that are present in the real world, but sometimes not present in university learning and teaching
- Promoting learner engagement
- Recognising learners' values and explicitly creating opportunity to engage in valued activity
- Promoting a variety of non-cognitive learning, sometimes labelled 'soft skills' or similar

- Valuing reflection
- Increasing students' efficacy

However, we recognise the need to be critical about the proposition that networked learning is an inherently valuable idea and so the questions that inform our ongoing work include attention to the ‘why’ and ‘how’ of networked learning at AUT.

The papers in this symposium identify 4 specific cases, questions or challenges which are representative of our efforts to a) understand networked learning in the context of AUT and b) apply it to our ongoing work to support learning and teaching at AUT.

In the first paper, Paper 1 Author seek to apply key ideas from networked learning to the practices of educational design at the course level and how to implement this as an institution. The objective of this paper is to propose an institutional approach to design for networked learning at the course level. The implementation approach should be systematic not uniform. A tiered approach to implementing design for networked learning at a course level is proposed, along with future work needed for the implementation across our institution.

In the second paper, Paper 2 Author examine a specific case of learning design in a single course in health science. The case study explores how the course design reflects eight principles of design for networked learning and proposes some recommendations on design for networked learning at a course level. It links practice and theories and illustrates how networked learning is unpacked in the context of the course design.

In the third paper, Paper 3 Author explore how networked learning informs a view of learner control over networked learning. This paper focuses specifically on designing the student experience on an institutional (policy) level in the context of a higher education institution in Aotearoa New Zealand and how a networked learning framework can inform that.

In the fourth paper, Paper 4 Author frame a proposed case study which aims at exploring to what extent Networked Learning enhances classroom experiences at the authors’ institution and how the authors’ institution could adopt networked learning in producing Great Graduates, the authors' institutional mission.

Both individually and as a symposium, these papers are intended to stimulate discussion about the application of networked learning in specific contexts and further the ongoing work to refine thinking about what networked learning is and how it is useful to higher education.

A Proposed Institutional Approach to Designing for Networked Learning at the Course Level

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Abstract

This conceptual paper proposes a design approach for implementing networked learning at a course level at a University in New Zealand (Aotearoa). Networked learning has been noted to have many benefits for learners in the growing body of literature. However, the principles could be implemented differently depending on the institutional context, strategic goals and current practices. The objective of this paper is to propose an institutional approach to design for networked learning at the course level. The implementation approach should be systematic not uniform. This paper outlines the institutional context and rationale, evaluates each of the eight principles of networked learning to institutional context and suggests implementation ideas. A tiered approach to implementing design for networked learning at a course level is proposed, along with future work needed for the implementation across our institution.

Keywords

Learning Design, Educational Design, Networked Learning, Higher Education, Institutional Approach

Introduction

Course design is a key contributor to learner success. Traditional course design in higher education, which relies heavily on individual academics to define the curriculum and develop materials, is no longer sufficient. The COVID-19 pandemic caused a dramatic change in learning and teaching in tertiary institutions. This change reinforced research evidence that passive learning and didactic modes of teaching are ineffective (e.g., Biggs, 2012; Deslauriers et al., 2019). While active learning as a concept is well accepted by our academics, their teaching practices are influenced by less effective course design. Networked learning offers another alternative to didactic

teaching. In NL, learners are active participants in their own learning and much of that activity is social – learners work with others in order to flourish. Networked learning seeks empower learners, engage them in dynamic collaborative activity and allow them to grow in a dynamic, collaborative way. Goodyear (2005) suggested that "successful networked learning depends, to a considerable extent, on well-targeted effort at design time – designing good learning tasks, ensuring good access to robust and appropriate technology, and helping create a convivial learning culture" (p. 84).

Our institution, Auckland University of Technology (AUT), is looking at networked learning from an institutional perspective to achieve its mission of 'Great Graduates'. The university's strategic directions to 2025 have informed the Learning and Teaching Roadmap to 2025. As the authors work in a central learning and teaching unit, our team supports the implementation of these strategic goals. As such, we are interested in applying networked learning design in our course design and how to implement that at the institution level. There is a growing body of literature highlighting the benefits of networked learning, including many that AUT's our strategic goals and directions.

We, the authors, have been working to adapt the NLEC (2021) redefinition of NL to fit our context:

> "Networked learning is a view of learning that relies upon actants' engagement in valued activities that are situated and contextualised, in a learning environment that cultivates connections between the actants. The actants operate as a learning community in which individual actants are connected to one another and to the resources of the community and where critical reflexivity is practiced by the community. Networked learning is designed and facilitated to support collaborative reciprocal co-construction of meaning, identity and other products which represent 'learning'".

Networked learning, as an idea, provides potentially fresh perspectives on learners, learning environments, learning activity and teaching, among other things. This paper focuses on the applicability of networked learning principles to our work to support learning and teaching across our institution, especially focusing on the 'why' and 'how' for an institutional approach to implement design for networked learning at the course level.

However, NL does not include prescriptions for practice. Therefore, principles and practices are necessary to support the implementation process by academics who engage with the course design as part of their professional practice. In this article, we describe an institutional approach to design for networked learning at the course level. We begin with some context about our institution. Then we discuss our design approach: the focus, priority and guidance for each principle and the tiered implementation approach. Finally, we outline future directions for our work.

Rationale and Context

AUT is the youngest University in Aotearoa (New Zealand, NZ), with a strategic ambition of building its position as NZ's university of technology. In AUT's strategic directions for 2020 –2025, there are five board themes: 1) Creating exceptional learning experiences; 2) Discovery and application of knowledge for wellbeing and prosperity; 3) Responding to our place in the world; 4) Building our position as NZ's university of technology and 5) Being a place where people love to work and learn (AUT, 2019). Each strategic theme is broken down into various goals and aspirations. AUT's mission is to create great graduates by offering an exceptional learning experience that prepares students to be successful wherever in the world their career may take them. Exceptional learning experiences (XLE) will be achieved through delivering compelling programmes, going beyond educated and employable, designing student-directed learning, and supporting great teaching (AUT, 2019). The XLE framework has three pillars: authentic assessments, work and social connections and interdisciplinary collaboration. This theme is most related to the work in the authors' unit. In 2020, authentic assessment was the theme for the year for implementing the XLE framework until a global pandemic interrupted many plans, at the same time, it also prompted other explorations to support learning and teaching at our university. Networked learning design was one of them. Before further explorations of embedding networked learning design in our university, we also considered our values and traditions.

AUT has a strong tradition as an on-campus institution since its inception as a technical school in 1895 (AUT, 2021). In addition, AUT embraces its place in the world, being in Aotearoa New Zealand with a strong commitment to Te Tiriti o Waitangi, the document which defines the partnership between Māori and non-Māori inhabitants of Aotearoa. Māori world views in general and Te Tiriti o Waitangi (Treaty of Waitangi) in particular, emphasise the value of relationship building and in-person (face-to-face) interactions for staff and students. This

highlights a tension between the desire to be a contemporary university of technology while maintaining a robust on-campus experience for its students. Many staff and some students see a divide between 'technology-enhanced' (as online) and 'face-to-face' teaching. While this can be a challenge for implementing networked learning, it can also be an interesting opportunity. As the authors believe that networked learning is about human activities that centre on the endeavours of learning, it is not a pedagogy nor educational delivery, it is not about technology.

Networked learning is an emerging practice at AUT. Even though while the AUT's centrally supported course design process incorporates some networked learning ideas, they are often not intentionally applied as 'networked learning'. As we consider how to embed the principles in course design, we started with a definition of networked learning for our institution. A definition alone is not enough to support implementation, nor it is easy to grasp, as such we wanted to definite a set of principles in the design, much like how we have done with our recent learning management system replacement implementation. This leads to the team investigating the eight networked learning principles proposed by Ponti and Hodgson (2006; Hodgson & McConnell, 2019). While these may not be the single set of principles agreed by the networked learning community, it provides clear guiding principles for networked learning design. As a group we discussed and debated over the merits of the principles and potential challenges of implementing them in our institution. What an institutional approach for the implementation may look like, whether we could rank or prioritise one principle over another and still achieve important benefits of networked learning design. As we consider how to more fully embed the principles of Networked learning in course design, we also need to consider the practicality of including all eight principles in the initial implementation. Ponti and Hodgson (2006) being the champions of networked learning have designed interactions to embed all eight principles and acknowledged the challenges of doing so. In the context of AUT, reflecting and learning from our own experiences and challenges in implementing institutional wide changes. This leads our proposed design approach to prioritises some principles for a tiered approach implementation. We believe this approach will provide better support to staff and courses new to this approach, while allowing flexibility to suit the context of a particular course. The principles will be prioritised based on our context, strategic goals and current practices.

Applying Ponti and Hodgson's (2006) Networked Learning Principles at our Institution and Design Approach

This section describes each of the networked learning principles, how we interpret it at AUT, and its importance in relation to our strategic goals, mission and values. The presentation includes comments on the priority of the principle in our design approach. These priorities inform the design approach we provide to our staff for embedding networked learning principles in their course design. Finally, we provide suggestions on how to implement these principles. Notably, the eight principles are interconnected. As such, implementing one can have a positive effect on another.

Principle 1: Our focus is on learning which has a perceived value to the learners

This principle emphasises the centrality of learners in NL. Learning intentions, activity and assessment should align with learners' goals, values and aspirations. This principle aligns well with AUT's strategic priority of creating exceptional learning experiences for our students, which is also focused on the central place of the learner in learning and teaching activity. Our focus on exceptional learning experiences highlights authentic assessment practices, emphasising professional and community connections within their studies and interdisciplinary collaboration. We cannot impose value of learning to our learners, but we can include design elements to enhance the perceived value for them. Students' goals may vary from simply passing the course, gain a qualification, get a better job, or make the world a better place through applying their learning. Our emphasis in operationalising this principle is on helping students recognise the value built into programmes, courses and individual learning activities rather than catering to each student's individual wants or needs.

In ideal situations, the learning outcomes, often defined as module, course or programme learning outcomes, reflect learning which is highly relevant to and valued by learners. However, we must not take this point for granted. We believe, initially, we can increase the perceived value to the learner by incorporating other principles in the course design. Hence, in our design approach, this principle is not essential for the first implementation. Instead, we intend to work towards this principle through a constructively aligned curriculum to enhance the "perceived value" for our learners.

We can achieve this principle by making the value of learning explicit to our learners, which means making the learning outcomes at the course, week, task level explicit. Where possible, we can also find out learners' motivations and goals for their studies and help them connect what we have in the course to their goals. This could mean making the development transferable skills explicit to highlight connections between coursework and other aspects of learners' lives. Incorporating authentic contexts, examples, assessment tasks; problem-based assessments or tasks; or student-led project-based courses are some of the ways to embed this principle.

Principle 2: Responsibility for the learning process is shared (between all actors in this process)

This principle focuses on students and their shared responsibilities in the learning processes within the course. This means giving students shared control over what they want to learn, how they want to learn, how their learning is assessed and more. Overall, empower students in their learning. This principle aligns well with the "designing student-directed learning" goals at our institution. While the intent of this principle is highly desirable, in terms of implementation, this principle is quite hard to achieve in the initial stage. This is mainly due to prevailing teaching practices at our institution and the need to increase familiarity with pedagogical approaches which emphasise learner agency and shared control in learning processes. We believe shared responsibility will be more successful when we can incorporate the design at a programme level to scaffold our students (and staff) to be more ready for shared responsibilities in their learning processes. Hence, this principle is not included initially, due to the potential lack of readiness for staff and students to include it.

We can achieve this principle by creating opportunities for students to exercise control over their learning. This could include self- and peer- assessments as part of assessment submission, learning tasks to scaffold learner agency into their learning processes. We can design student-directed discussions or activities, allowing them to input or even lead parts of their learning. We can also design processes to allow student input in the course, such as input on (some) course topics, format (online, face-to-face, or discussions, student-led facilitations), or co-design parts of course content. Students can also have input into assessments, from assessment choices (e.g., live or recorded presentation), input into marking criteria or co-design it, co-design (parts of) assessments.

Principle 3: Learning is situated and context dependent

Context matters for learning, and we should design learning activity to be situated and contextualised for the course and its discipline. This is essential as part of our vision to create exceptional learning experiences (XLE) for our students, as authentic assessment is one of the XLE pillars. We want to include more authenticity in our course design, using real world contexts and examples, using context and situations that are familiar and personally meaningful to our students. By doing so, we can create connections between their learning and the real world. This way, we can engage and validate the students' existing knowledge and experiences, which is an essential characteristic in constructivist teaching (Baviskar et al., 2009). In addition, all these will also help us enhance the perceived value of learning for our learners (Principle 1). We believe it is relatively easy to include this principle in the course design even at the initial stage. Therefore, this principle will be given a high priority in our design approach and implementation.

We can achieve this principle by using real world examples in the course to make content/concepts easier to relate to and use examples, contexts and situations that are personally meaningful to learners. We can include authentic assessments and tasks that reflect or simulate real work tasks and contexts, use real world case studies and scenarios in the course, and anything that helps learners connect their formal education to the real world. We can also create opportunities for learners to interact with industry/world of work through research, guest speakers, placements or internships, workplace visits or collaboration projects with industry or community.

Principle 4: Time has to be allowed to build relationships

Relationships between individuals are key mechanisms of connections and salient for networked learning. The relationship development has to be catered for and not developed by chance. A key part of this, is creating time for relationship establishment and development of productive relationships. This principle means that we need to design deliberate activities and sufficient time for relationship building in our courses. This principle aligns strongly with our values and our place in Aotearoa, New Zealand. We need to consider the university philosophy and its commitment to Te Tiriti o Waitangi (Treaty of Waitangi). Even though the Treaty is not a law in New Zealand, it is being treated with great significance. This is especially important in the education system. Our higher education institutions have obligations to operationalise the Te Tiriti o Waitangi, through initiatives like embedding "mātauranga Māori" (Māori knowledge, culture, and world view) into the curriculum and into their

institutions. One of the Māori concepts "whakawhanaungatanga" aligns closely with this principle. It means "the process of establishing relationships, relate well to others" (Moorfield, n.d.).

Given the place of AUT in Aotearoa New Zealand and the commitment of AUT to honouring the partnership described by Te Tiriti o Waitangi emphasise the importance of this principle. This principle should be implemented purposefully by designing relationship building activities in class with sufficient time across the whole course to allow relationship building to take place. This means we will place higher value to the time given to build relationships, over other class activities such as covering content.

We can achieve this principle by being explicit about the value of relationship development and operationalising that value with activities which have relationship development as intended outcomes. For example, we can design meaningful icebreaker activities for learners to get to know each other from the start of the course and continue to enhance relationship building throughout the course. Options to do this are student led icebreaker questions for student groups or pairs at the start of each session or design opportunities for students to share their thoughts and experiences, and to socialise and get to know each other. We can include collaborative tasks that allow students to experiment or role-play, allowing them to get to know one another over time, or collaborative tasks that allow students to share their goals and work towards those goals.

Principle 5: Learning is better supported in collaborative settings and dialogue plays a major part in the collaborative learning process

Dialogue is an essential learning activity. It follows that we must create opportunities to promote collaboration and dialogues between students. According to Alexander (2018), dialogue in learning is cumulative, collective, reciprocal, supportive and purposeful to learners' deep understanding which maximises students' engagement and learning. The principle aligns well with all our goals to create exceptional learning experiences: delivering effective programmes, going beyond educated and employable, designing student-directed learning, and supporting great teaching (AUT, 2019). Without a doubt, this principle needs to be incorporated in our course design to support our students' learning beyond its current course setting and to learn beyond the university setting. We need to design collaborative work in different settings where students can practise together safely and learn from those experiences. Achieving this requires providing learning opportunities in the classroom, for example by building the time for dialogue as part of the learning process and by incorporating the questions leading to purposeful dialogue in the in-class learning activities.

We can achieve this principle by designing meaningful and purposeful collaborative working opportunities in the courses. Such as designing collaborative tasks for students to work on and achieve shared goals as a group, incorporating questions leading to constructive discussion within groups or pairs, designing group assessments to enable collaborative learning, which can include individual components to enable assessing individual capabilities and/or contribution to the group work. We can include tasks for collaborations such as small group projects, building joint output, participate in social networking, group share a special topic with the class, mentor one another (Young & Perović, 2018).

Principle 6: Social interaction allows for co-construction of knowledge, which promotes engagement of learners in work-based and problem-based learning

This principle underscores the need to include knowledge co-construction through collaborative work. This principle builds on Principles 3 to 5 with the focus on knowledge co-construction which promotes learner engagement in contextualised learning situations. In terms of implementing this principle at AUT, it aligns well with our goals related to exceptional learning experiences, especially for "designing student-directed learning" and "going beyond educated and employable". We want to create opportunities for students to "develop skills and dispositions that equip them for learning, life, work and professional practice" (AUT, 2019).
In terms of implementation, especially initially, this principle is easier to incorporate for courses that already are work based or designed for problem-based learning. Attempting to turn more courses into work-based and problem-based learning could be a whole new change project in teaching practices and course design itself. Co-construction of knowledge by students can also be a challenging idea to unpack for some of our teaching staff. Therefore, we believe this principle would be included later, as our practices mature, and we become more familiar with designing for networked learning.

We can achieve this principle by creating opportunities for students to share their learning, their experiences, and their own examples as a starting point. Designing group tasks that help students to link new information with

existing knowledge, including scaffolding these tasks to allow students to help one another to co-construct knowledge. We can also design collaborative tasks (and/or assessments) that require co-construction of knowledge, such as producing artefacts that require research, investigation and potentially problem solving. At a higher level, the course could include work-based, problem-based, or project-based learning that requires learners to solve real life problems or challenges with their group. A notable example from our institution involved design students and engineering students taking milk bottles from our campuses and turn them into new products. Engineering students made new materials from the recycled bottles while design students turn those new materials into new products, such as window screens and partitions for our campuses.

Principle 7: The role of the facilitator/animator is essential for collaborative eLearning

Further to Principle 2 above, this principle underscores the role of a 'facilitator' who performs a variety of roles often associated with 'teaching' in some form: mentor, guide, expert, manager, support provider, and mediator, among others. The course design will require active participation from learners and our lecturers to facilitate student activities to support collaborative learning. This includes but is not limited to peer learning, group activities and discussions. The Community of Inquiry model notes that collaborative tasks support teaching higher-order cognitive skills, and well-established social presence enhances and sustains cognitive presence (Garrison, 2011).

This principle supports our goal of "supporting great teaching" by emphasising the importance of the facilitator role in supporting collaborative learning for our students. While this principle can be challenging to implement initially due to pedagogical preferences and beliefs of individual staff members, this principle is considered incredibly important to be included even for the beginners. This is key for a central learning and teaching unit like ours to create positive changes in our teaching practices in our institution. This is crucial for sustainable changes in the way we teach and think about teaching, and the role of teaching. To make this happen, we will also need to support our staff through course design and through professional development.

We can achieve this principle by creating opportunities for learners to work on tasks, where the lecturers are active facilitators, rather than the source of knowledge. We want to structure group learning activities where facilitators are there to support, extend and provide feedback on student activities. In class, lecturers will take on the role of facilitators, they would scaffold the learning through managing group dynamic to enhance student learning as collaborative work and to support students learning how to learn with their groups.

Principle 8: Critical reflexivity is an important part of the learning process for evaluating and examining both the learning process itself and the resultant actions taken

This principle emphasises the role of reflection and reflexivity in meaning making. As course designers, we must design learning tasks which not only create opportunities for critical reflection but require reflection as a normal part of routine learning activity. Ideally, this will increase students' meta-cognition and equip them to take the reflective practice into other aspects of their lives. The principle aligns well with our goals to prepare our students "beyond educated and employable" (AUT, 2019).

Reflexivity takes practice. After reviewing on current practices in our institution, reflexivity is more embedded in some disciplines than others. We believe a programmatic approach to embed critical reflexivity and student-directed learning will be more effective. As a programmatic approach creates greater alignment across courses within the programme, allows scaffolding the practice throughout the programme, and creates more coherent learning experiences for our students. In addition, several case studies we reviewed, did not explicitly include reflexivity but were still able to gain benefits through networked learning designs (e.g., Kelly et al., 2017; Anders, 2018; Lee et al., 2018). Hence, while highly desirable, this principle is not essential in the initial stage.

We can achieve this principle by designing reflective tasks or assessments in the course and including time in-class to prompt students to reflect on their learning processes and the results of their actions. We can encourage students to make action plans from what they have learnt through their own reflection, remind students that the learning points from their reflection can be used for the course, or for beyond the course and in other aspects of their lives. It is important to design and scaffold guidance/framework/criteria/rubric for learners to reflect/evaluate their own work/practice. This is especially important at a programme level, so reflexivity can be scaffolded throughout the programme. We can also design learning tasks/projects that require learners to question and challenge current practices. Furthermore, the teaching team could model reflective practice by sharing their own experiences and learning points with their students.

Although each of the eight principles have been discussed separately, they are intertwined and related, so implementing one will have impact on another. As they are intertwined, it also enables us to take the tiered approach in our implementation design. Table 1 provides a summary of this section. In the next section, we will discuss our proposed tiered approach to the implementation.

Principle	Priority	Implementation Ideas
1 (perceived value)	*Medium*	• *Make the value of learning explicit to our learners by making learning outcomes explicit* • *Understand learners' motivations and goals and help them connect learning to their goals* • *Incorporate authentic contexts, examples, assessment tasks; problem-based assessments or tasks; or student-led project-based courses*
2 (shared responsibility)	*Lower*	• *Create opportunities for students to exercise more control in their learning. (e.g., self- and peer-assessment)* • *Include student-directed learning activities* • *Create opportunities for student input on course topics, learning tasks or assessment. Explore co-design of course content*
3 (situated and context dependent)	*High*	• *Use authentic (real world) examples, contexts, tasks and situations* • *Situate activity in contexts that are familiar or personally meaningful to learners* • *Create opportunities for learners to interact with industry/world of work through guest speakers, placements, workplace visits or collaborative projects with industry or community*
4 (relationship building time)	*High*	• *Design meaningful icebreaker activities to create opportunities for learners to get to know each other from the start of the course and throughout the course* • *Include collaborative tasks that allow students to experiment or role-play, allowing them to get to know one another over time*
5 (collaborative learning)	*High*	• *Design purposeful collaborative working opportunities in the courses.* • *Design group assessments to promote collaborative learning*
6 (knowledge co-construction)	*Lower*	• *Create opportunities for students to articulate and share their understandings, experiences or examples* • *Design collaborative tasks that require co-construction of knowledge, e.g., producing artefacts that require joint investigation and problem solving* • *At a higher level, the course could include work-based, problem-based or project-based learning that requires learners to solve real life problems or challenges with their group*
7 (facilitation role)	*High*	• *Design learning processes in which where the lecturers are active facilitators, rather than the source of knowledge* • *Lecturers as facilitators to scaffold the learning through managing group dynamic to enhance student learning as collaborative work and to support students learning how to learn with their groups*
8 (critical reflexivity)	*Medium*	• *Include tasks within course designs to prompt students to reflect on their learning processes and the results of their actions.* • *Encourage students to make action plans from what they have learnt through their own reflection* • *Design and scaffold guidance for learners to evaluate their own work.*

Table 1: Level of Implementation

Implementation – a Tiered Approach

In this section, we outline three levels of implementation in our institution, based on the priorities discussed in the previous section. We provide brief examples of what the implementation could look like at each level. The discussion focuses on which principles to include at each level, noting that implementation of each principle can be done at different quality, or at different level of nuance, depending on lecturers' level of experience and

confidence with networked learning design. For example, critical reflexivity can be included as a token activity without much guidance for students or it can be purposefully designed and embedded throughout the course.

As noted earlier, it is challenging to include all eight principles in the initial implementation. Especially for courses and course leads who have not incorporated networked learning design in the past. At the same time, it is also challenging to prioritise certain principles over others. One does have to ask, if we leave out some principles, can we still call it a networked learning design? We have learned from several case studies that has reported benefits in networked learning across different contexts, without embedding all eight principles. Their contexts span across professional settings (e.g., Ponti & Hodgson, 2006; Kelly et al., 2017), for professional development for teaching staff or teachers (e.g., Alexander & Fink, 2018; Lee et al., 2019) and an undergraduate business communication course (Anders, 2018). Even though we were unable to find case studies designed their implementation using the eight principles proposed by Ponti and Hodgson (2006) in the higher education setting with an institutional approach in its design. We can learn from these case studies and our own experience in implementing university wide changes. Reflecting on our original intention to implement networked learning design in our institution to support university's strategic goals. As we take an institutional approach to implementing networked learning design in our courses, a partial implementation is more realistic to achieve than trying to incorporate all eight principles, especially in the initial stage. As such, we propose a tiered approach for implementation. This allows a scaffolded approach to implementing networked learning design in our courses for both our staff and students. This approach also provides a systematic way of implementation that can be customised based on the level of experience of networked learning design and how well the existing course design aligns with the networked learning principles. Fawns (2019) talks about teaching as design and as orchestration which fits in well with our goals of supporting great teaching. We hope, over time, we can use networked learning design experiences to increase staff capabilities in course design and facilitation in our students' learning processes (orchestration).

In the initial implementation would include Principle 3, 4, 5 and 7. At this level, the emphases are on the situated and contextualised learning, to allow time to build relationships, to include collaborative learning and for the lecturers to be active facilitators in the learning process. These principles are selected as essential as they are highly aligned with our strategic goals in the XLE framework, align with respect to the Treaty in our context, and supporting great teaching. We believe that these principles are also easier for "beginners" to adopt and accept based on our current practices. It is important to acknowledge that it is difficult to leave out principles. Learners engaging in valued activities, and the community practising critical reflection are key to the essence of networked learning, therefore hard to imagine a networked learning design without them. That said, it is much harder to establish perceived value, if our learning is not situated and context dependent; much harder to build the community without allowing time to build relationships, design collaborative tasks to enhance the relationship building and to have these learning activities well facilitated. It is much more challenging to include knowledge co-construction and a sense of shared responsibility in learning without some foundations in the community building. That is why, in the initial implementation, only four Principles are included for courses and staff new to networked learning design. Embedding these four principles (3, 4, 5 and 7) should allow a solid foundation for adding more principles in the next levels.

At the last two levels, it gets even more challenging to determine which to include. It is tempting to include all. Noting that these principles do intertwine and implementing one well can have positive benefits in another. The reverse is also true, if we do not have a solid foundation or enough experience from staff and students, it is much more challenging to embed some principles, such as Principle 2 and 6. As knowledge co-construction works better if students take an increased ownership and responsibility in their own learning process. While each principle can be implemented on its own, they create positive effects to one another if they are paired. Hence, Principle 2 and 6 are added at the "advanced" level. We believe, by now, our learners should be more ready to take on more responsibilities of their own learning processes and to co-construct knowledge in their learning. Our lecturers will also be more ready to let their students take more control of the course and their learning process, and to embed collaborative opportunities for knowledge co-construction.

This leaves us with Principle 1 and 8 to be added in the "enhanced" level. We believe that when we have implemented the initial level well, it is easier to add on increasing the perceived values of learning for our students and to include critical reflexivity in the design. A course designed to create a sense of community and well-facilitated collaboration activities that are situated and relevant for our students in its own should create values for our students. Then the course design in the next level simply need to enhance and signpost these values. Plus embedding critical reflexivity to support students reflect on their own learning will further enhance the sense of perceived value, as well as preparing them for the next level. Table 2 has the summary.

Level of Implementation	Explanation	Principles
Initial	Initial implementation has all the high priority, must-have principles	3 (situated and context dependent), 4 (relationship building time), 5 (collaborative learning) 7 (facilitation role)
Enhanced	Enhanced implementation adds on two more principles for enhancement	Add 1 (perceived value) and 8 (critical reflexivity)
Advanced	Advanced implementation adds on the final two principles to include all	Add 2 (shared responsibility) and 6 (knowledge co-construction)

Table 2: Level of Implementation

Initial Implementation

The first level of implementation is for courses completely new to networked learning design approaches. It will include Principle 3, 4, 5 and 7. The course will include icebreaker activities at the start and throughout the course to support relationship building. The course content and materials will weave in examples from situations and contexts that students could relate to and may be personally meaningful for them. There will be real world examples, scenarios and case studies where appropriate to help students connect what they learn to other aspects of their lives. There will be collaborative tasks throughout the course for students to learn as a group, share and learn from one another while the lecturers will play an important facilitation role for the collaborative tasks in class.

Enhanced Implementation

In the next level, two more principles (1 and 8) will be included. This can be for those who have started from the first level and moving onto enhancing their practices or for those who already have course designs well aligned with networked learning principles. The implementation will include making the learning outcomes at all levels explicit, aligned and communicate this clearly to the students throughout the course. It will include tasks for students to identify their own goals and lecturers supporting students to connect learning to their goals. There will be critical reflective tasks for them to take more agency in their own learning processes. Students will be guided through reflective tasks, especially for courses and programmes less familiar with reflective tasks. Eventually, reflexivity will be embedded and scaffolded throughout the programmes.

Advanced Implementation

In the "advanced" level of implementation, all principles will be incorporated in the design of the courses. Principles 2 and 6 will be included in the design. There will be opportunities for students to have input into their own learning process, whether it relates to the content, format, delivery, or assessments in the course. The aim to increase the level of shared responsibilities in the learning process from students. These opportunities will look different depending on what is appropriate for the course and discipline. The course will extend the collaborative tasks to include elements of knowledge co-construction to further enhance the learning experiences. This includes more student-directed learning tasks and opportunities, such as student-led topic explorations, discussion, or projects.

As an institution relatively new to networked learning, a tiered approach as mentioned above seem more achievable. This provides a systematic approach while allowing flexibility to customise the approach to suit each course's situation. Paper 2 is an example of a full implementation as the course design was well aligned with the NL design.

Conclusion and Future work

This paper attempts to apply networked learning principles proposed by Ponti and Hodgson (2006) as part of an institutional approach to implementing networked learning in higher education at the course level. The authors have considered each principle against the institutional context, values, and goals, then prioritised them for implementation. The paper also provides suggestions on how to implement each principle and proposes a tiered approach for implementing networked learning at its institution. The proposed implementation focuses on the inclusion of networked learning principles, not how well or the level of each principle is embedded to make the

implementation simpler. It focuses on the high-level design, noting many details will be designed later. Institutional wide implementations always come with challenges and practical issues to work with. Paper 3 shares some aspects of challenges and difficulties focusing on student-directed learning.

As for next steps, we can refine our design approach based on the feedback from the conference, and design evaluation processes for our design. Then we can call for expression of interest for early pilots to help further refine our design and implementation guidance. We aim to collect data and feedback from a few pilot courses, through observations, interviews, and surveys to refine our implementation strategies, guidance and evaluation. Paper 4 is an example of a case study approach to evaluate the design in classroom settings.

We will need to create further guidance and support to implement networked learning designs in our courses. This includes resources and professional learning suite. Resources could include some practice examples, guiding questions to help with course design, and implementation examples for different teaching situations at our institution. Even though our focus for networked learning design is not on delivery, these examples will help illustrate what the implementation could look like for our courses and our teaching context. For example: our face-to-face humanity versus science courses; for blended or online courses, or for studio-based courses. Professional learning suite could include sessions on networked learning designs, for designing tasks and for effective facilitation. We would also want to create learning opportunities with networked learning design for our staff, so they can experience what that is like as learners.

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Design for networked learning: A case study in health science

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Abstract

Higher education (HE) institutions have been transforming dramatically since the pandemic started late 2019 and early 2020. After an initial period of emergency online teaching and learning, HE educators have focused our energy on supporting students' learning in a complex dynamic learning environment, where digital/online - material/physical - social elements are interwoven and interrelated. Networked learning can be a useful medium for us in this complex context.

This paper explores a case study of design for networked learning in a health science postgraduate course. The course was designed in the context of a New Zealand university. The paper will examine how the course design reflects the eight principles of design for networked learning, and proposes some recommendations on design for networked learning at a course level. It links practice and theories, and illustrates how networked learning is unpacked in the context of the course design. While the current paper focuses on the design of the course, it is suggested that future research should conduct an evaluation of the design and develop empirical studies on students' and teacher's experience.

Keywords

Networked learning, digital, online, situated learning, self-directed learning, teaching, socio-cultural, reflexivity, critical thinking, learning by doing, collaboration, dialogue, facilitator.

Introduction

The education landscape has experienced a dramatic transformation in the last two years due to the Covid-19 pandemic. Student learning is now taking place in a complex social-material-digital environment (Peters et al., 2020). Digital and physical worlds have become entwined, and the boundary between the two worlds is becoming blurred. Learning in this context entails the entanglement of students, teachers, digital technologies, tasks,

activities, learning resources, artefacts, tools, space, and social systems surrounding students and teachers (Carvalho & Yeoman, 2018). In this complex and everchanging world, how do we - educators - design learning to empower our students and support their success?
A recent Networked Learning Editorial (2021) argued that networked learning has a lot to offer for educators in this context. Networked learning as a research field focuses on three sets of phenomena - human/interpersonal relationships, technology (especially digital communication technology), and collaborative engagement in valued activity - and their intertwinement in practice. Goodyear and colleagues argued: "Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies." (Networked Learning Editorial Collective (NLEC), 2021)
This concept of networked learning comprises with five constituent parts: (1) processes of collaboration, (2) processes of 'coming to know' and of acting on the implications of that knowledge, (3) human relationships that require and strengthen trust and reciprocity, (4) a larger purpose of network's activities, (5) enabling technologies (Networked Learning Editorial Collective (NLEC) et al., 2021).
Emergent pedagogical ideas that underpin networked learning design are reflected in eight principles articulated by Hodgson, Ponti and McConnell:

1. The focus is on learning which has a perceived value to the learners.
2. Responsibility for the learning process should be shared (between all actors in the network).
3. Time has to be allowed to build relationships.
4. Learning is situated and context dependent.
5. Learning is supported by collaborative or group settings.
6. Dialogue and social interaction support the co-construction of knowledge, identity and learning.
7. Critical reflexivity is an important part of the learning process and knowing.
8. The role of the facilitator/animator is important in networked learning.

(Hodgson & McConnell, 2019; Ponti & Hodgson, 2006)

This paper focuses on a case study of design for networked learning in a health science course. This research employs a case study, exploratory approach to investigate the course design (i.e., structure of the course, course material, learning tasks, course descriptor, and courseware in Canvas - a learning management system). The research aims are to (1) investigate how the course design reflects the eight principles of design for networked learning, and (2) suggest recommendations on design for networked learning at a course level.

Couse design - a case study in health science

The case study is the design of a postgraduate core course in health science - Concepts of Rehabilitation in a university in Aotearoa/New Zealand. It was designed in Canvas as a part of an institution-wide project. In this project, courses were moved from Blackboard to Canvas and redesigned with enhancement to support student learning.
This health science course focuses on the concepts which underpin rehabilitation practice. Concepts in this case mean the big ideas that provide students with tools to think about ways of working, processes, and beliefs. Such concepts are commonly transdisciplinary, not specific to any one discipline.
The course helps students from various rehabilitation contexts and disciplinary locations to explore what is taken-for-granted in rehabilitation, and to critically reflect on the ways their own practice is shaped by these elements for better or worse. The course provides an opportunity for people to stop and explore the assumptions they might hold, to think about these in light of the diversity of theory and evidence and consider what this means for rehabilitation practice, education, and research in the future. Students are supported to locate these ideas within the specific Aotearoa/New Zealand context, including the implications of Te Tiriti O Waitangi (Treaty of Waitangi) for the production of mana-enhancing (empowering) care and practice.
Learning outcomes (LOs) of the course comprise:

- LO1. Critically analyse current rehabilitation concepts, using theory and evidence
- LO2. Critically analyse own rehabilitation practice in the context of existing theory and evidence
- LO3. Integrate knowledge of rehabilitation concepts in an identified area of rehabilitation practice
- LO4. Present work at the appropriate academic standard

About the course

"Concepts of Rehabilitation" is delivered in 11 weeks with a full introductory day (face to face, on campus with online access), and online material delivery on Canvas. This includes weekly peer-directed discussion groups via video conferencing, in person, or mixture. Students have fortnightly Q&A sessions via video conferencing with the teacher. Content of the course covers the following topics:

- Current and historical models of rehabilitation
- Principles underpinning rehabilitation such as person-centredness and quality of life
- Key rehabilitation processes such as goals, teamwork, working with family/whānau, and outcome measurement
- Factors influencing rehabilitation
- Critical approaches to support reflection on rehabilitation practice

The course has three formative assessments that support students to complete a summative assessment. Weekly learning tasks were designed to scaffold students' learning and support their work on formative and summative assessments. Some snapshots on the course in Canvas are provided in Figures 1 - 2. The summative and formative assessments are presented below.

Summative Assessment

The summative assessment is a written assignment and due on Week 11. It consists of three inter-related pieces of work, each of which should be 1200-1400 words, for a combined total of 4000 words. The assignment must relate to one named rehabilitation concept that is chosen by students. The three components are submitted together, in one assignment. They should build on (and refer to) each other.

- Part One: Complete a critical analysis of the chosen concept. Use theory and evidence to examine how it has been understood (conceptualised) in the literature and in practice.
- Part Two: Critically analyse how you have understood and enacted this concept in your own practice. Draw on the critical analysis of the concept completed in Part One and other literature as appropriate.
- Part Three: Detail how the new understandings of the concept (generated through critical review of the literature and reflection on your own practice) could be integrated into an identified area of rehabilitation practice by making one detailed recommendation for practice. Ensure this section is supported with theory and evidence.

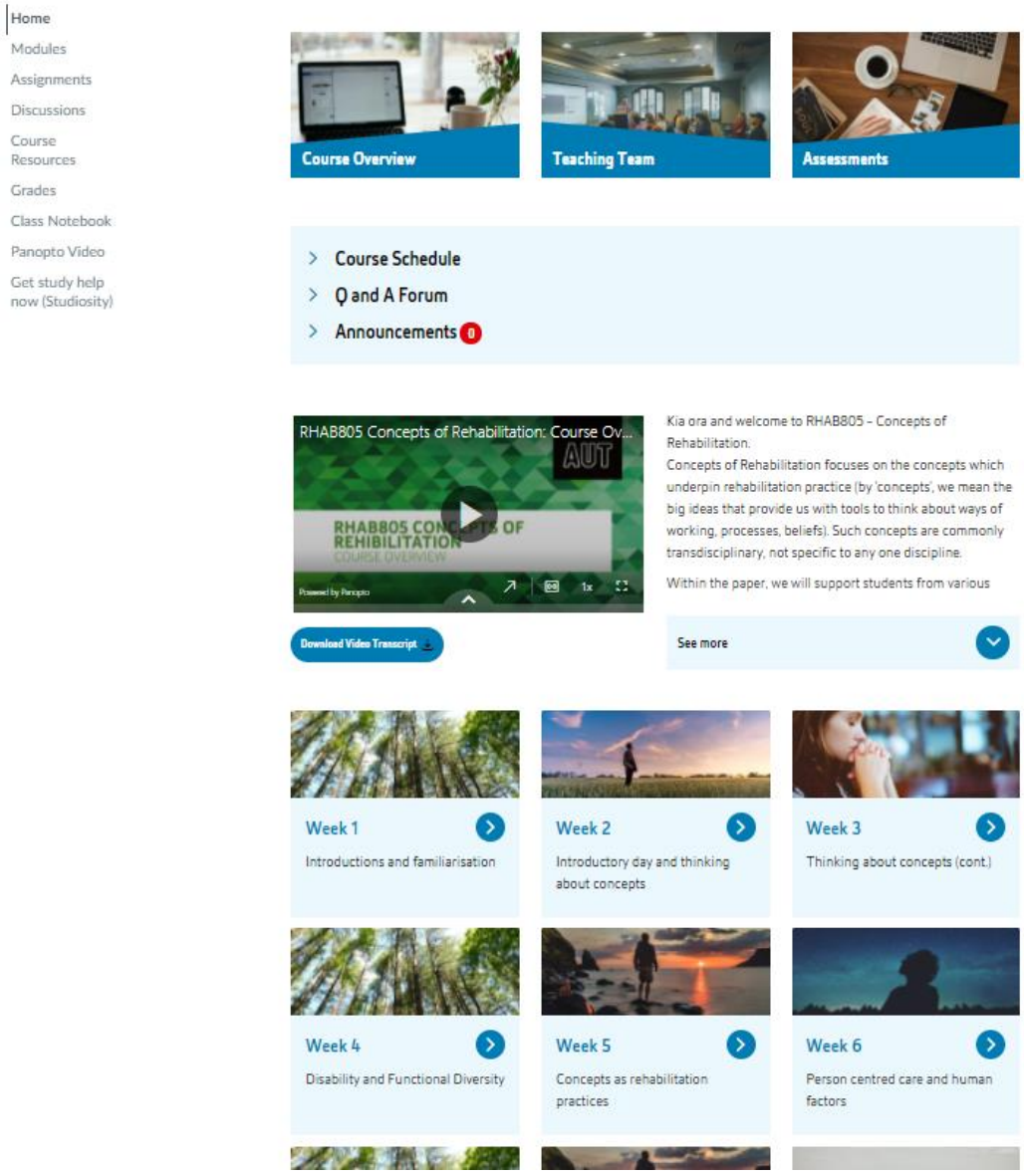

Figure 1: A Section of the Course Homepage in Canvas

Course Learning Outcome Assessed: LO1, LO2, LO3, LO4
Time Commitment: 118 hours, including the work on formative assessments

Suggested Procedures

- Complete all formative assessments
- Get feedback
- Attend weekly online/face-to-face group discussion
- Complete the writing of summative assessment
- Submit the assessment

Marking and Feedback

- Feedback will be provided on formatives within one week of submission.
- Summative will be marked according to marking grid, with grades and feedback provided within three weeks of submission date.

Submission Information

- Formative assessments are submitted through Canvas.
- Summative assessment is submitted via Turnitin portal.
- Late submission of formatives must be negotiated with the course lead.

- Late submission of summative needs a Special Considerations Application.

Week	Topic(s)	Assessment
1	Thinking about concepts I, introductions	
2	Full introductory day, DISCUSS group activities	
3	Thinking about concepts II	
4	Disability and functional diversity	LO1 Formative Due end of week
5	Rehab practices as concepts	
6	Human factors in rehabilitation	LO2 Formative Due end of week
7	Rehab as part of wider social condition	
8	Independent study and DISCUSS groups	LO3 Formative Due end of week
9	Independent study and DISCUSS groups	
10	Independent study and DISCUSS groups	
11	Independent study and DISCUSS groups	Summative due

Figure 2: Course Schedule

Formative Assessments

Each formative assessment focusses on one part of the summative assessment. Students get feedback from the teacher on their formative assessments' work, then revise their work and use it for their summative assessment.
Formative Assessment 1 (due by the end of Week 4) is to support students to complete Part One of the summative assessment successfully. Students are asked to choose a concept of interest, create a diagram of the concept – using 2-3 pieces of literature (or one concept analysis, metasynthesis, or systematic review), and develop a diagram of the concept. They are asked to answer the following questions: Why is it a concept? What are some of the key theories associated with the concept? Provide a reference list.
Formative Assessment 2 (due by the end of Week 6) focusses on Part 2 of the summative assessment. The task is to submit two paragraphs of students' critical analysis of their own rehabilitation practice.
Formative Assessment 3 (due by the end of Week 8) asks students to identify three possible things that could (or should) be done differently in rehabilitation that are related to the concept that they choose. This formative assessment supports Part Three of the summative one.

Discussion on the course design and the eight principles of design for networked learning

The above section has outlined the design of the course "Concepts of Rehabilitation". This section will examine and discuss how the course design reflects the eight principles of design for networked learning. Each principle will be explained and reflected in the context of the course design.
Week 4 design will be used as an example. The week content is on disability and functional diversity (Fig. 3).

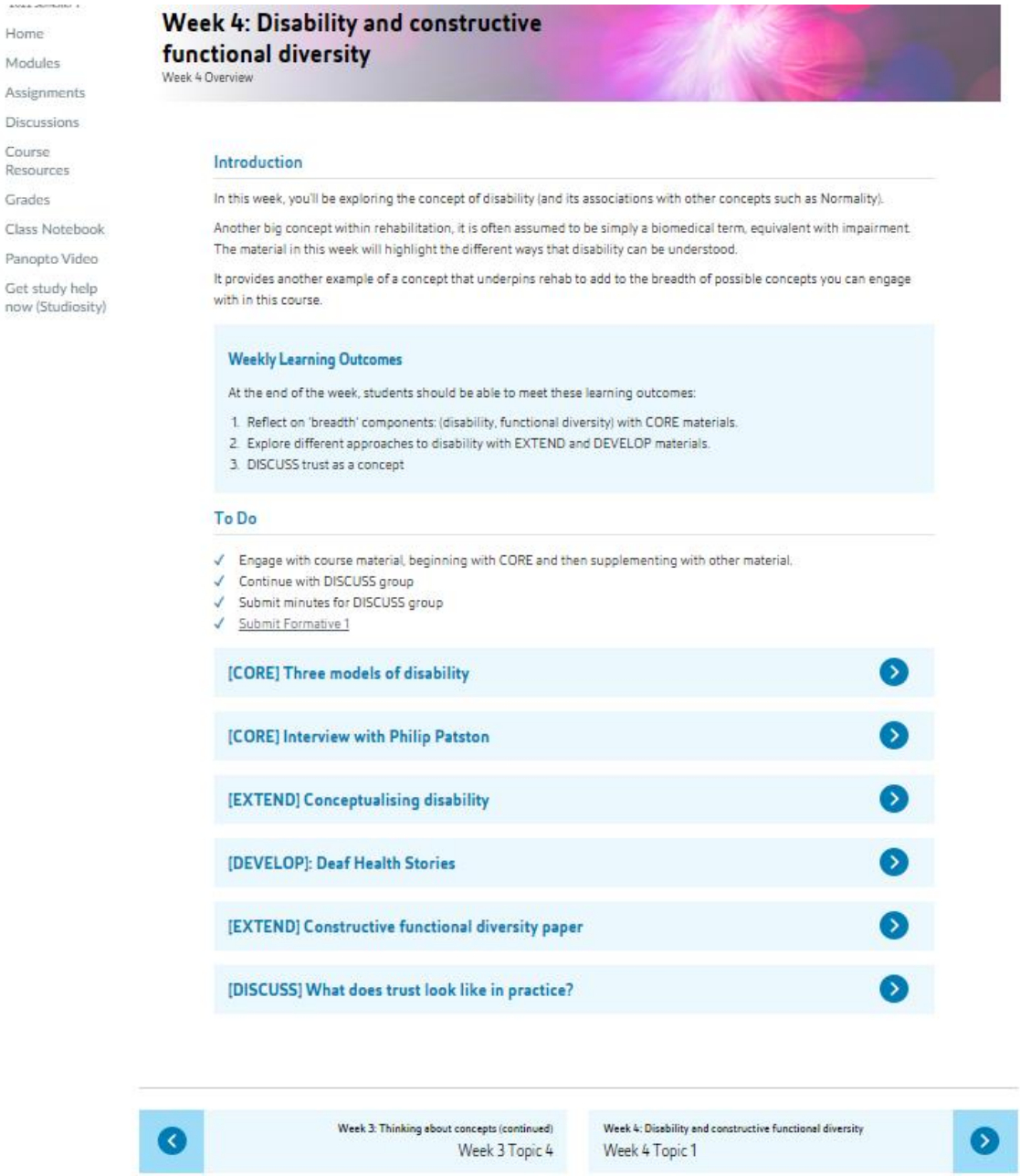

Figure 3: Week 4 Overview Page in Canvas

Besides lectures and readings as learning resources, the teacher interviewed Philip Patston - founder of Diversity New Zealand Ltd and former Chair of the Auckland Council Disability Advisory Panel. In the interview, Philip discusses his theory of Constructive Functional Diversity, which allows students to think beyond disability and impairment located within the individual, but also challenges aspects of the Social Model of Disability. The teacher recorded the interview and used the video recording as a learning resource.

Content and learning tasks of Week 4 support students to complete Formative Assessment 2. After submitting the assessment, students get feedback from the teacher. They are asked to revise their work based on the feedback. Their work is then used as a part of the Summative Assessment.
The Week 4 learning tasks, which students are asked to complete, are:

- Watch Philip's interview, lecture videos given by the teacher on three different approaches to understanding disability, complete readings on disability and constructive functional diversity.
- Watch "Deaf Health Stories" video- an output from a research project conducted by the teacher and the team.
- Discuss with the group "What does trust look like in practice?" (Discussions are in the week following the 'materials' week. This discussion related to the concept of trust in Week 3)
- Discuss with the group in video conferencing session in the next week (Week 5), with seven guided questions for discussion.
  Presuming most practitioners primarily rely on the medical/individualistic lens:
  What drives this focus and sustains it?
  In what ways does your practice benefit through its use of the lens it does?
  In what ways can it risk marginalising patients (and staff)?
  How would your practice look if you designed it with the social model as the primary approach?
  What would happen if constructive functional diversity were the lens applied?
  Thinking about your practice environment from arrival through to discharge, what would it be like for a Deaf patient to negotiate? Where would the gaps be? What assumptions are made? Whose concerns are prioritised?
  What can we do to ensure that trust is maximised within the therapeutic encounter?

Week 4 learning tasks, content and the assessments will be used as materials for the discussion in relation to the eight networked learning design principles.

Principle 1: The focus is on learning which has a perceived value to the learners

This principle focuses on learning as an ongoing process which involves knowledge that is valuable to students. Learning is the process of sense making in students' own world. It leads to change, solve issues, and create values. Knowledge (cognition or intelligence) is distributed across social network, between and among social agents such as people, students, cultures, artifacts, environments and situations (Salomon & Perkins, 1998). In the learning process, students develop their capacity to interact with these social agents, learn, and generate new perspectives. Students' learning is based on their prior experience and knowledge, and influenced by their beliefs, assumptions, socio-cultural norms, context/situations, and histories. Their knowledge and practices are continually developing and inherently indeterminate.
In "Concepts of Rehabilitation", the value of the course is presented at the frontpage. Learning outcomes of the course and weekly topics are made explicit to students. The reasoning for each learning activity, which students are asked to complete, is explained clearly. This is the first step in supporting students seeing the value of what they learn.
The course design focusses on learning that has perceived value to the students, who have worked, and/or will be trained to work as professionals in the field. Learning tasks and assessments of the course are designed so that students will interact with different agents in their social network such as their classmates, who usually have a lot of work experience and deep understanding of professional context, the teacher, their context, and learning resources in Canvas. For example, students will be asked to discuss Week 4 topics with their classmates in the video conferencing session, supported by seven guided questions above. Students will also have opportunities to interact with rich resources in the social network such as a short introductory lecture to different models of disability, an interview with Philip, an expert in the field, the "Deaf Health Stories" video, peer-reviewed articles/readings. This will provide the students with opportunities to develop their capacity to interact with social networks. They will discuss the content in the context of their own practice, make sense of the knowledge that matters to them and their own situations. Their experience, knowledge, assumptions/lenses, and context are connected to and/or challenged in the light of the new knowledge and in-depth discussion, which all add value.

Principle 2: Responsibility for the learning process should be shared (between all actors in the network)

This principle relates to student-directed learning, originating from the work of Malcolm Knowles (1975). From this perspective, students are invited to take greater responsibility in the learning process. The process of sharing responsibility between students and teachers is influenced by various factors (e.g., socio-cultural norms, power, gender, and age). Language and discourse, as medium of knowledge construction, power exercise, relations, and

professional identity development, play an important role in the learning process. "Implicit in this view is the idea that we are both shaped by such social and linguistic processes and are agents who can intervene in and change them" (Hodgson & McConnell, 2019, p. 46).
During the course development, the narratives running through the course were developed. The language and discourse were pitched as friendly, conversational, and also professional. Some examples consist of "Kia ora and welcome to RHAB805 - Concepts of Rehabilitation.", " In this week, you'll be exploring the concept of disability (and its associations with other concepts such as Normality).", and "As you will see in the Discussion Forum, I [the teacher] have introduced myself giving a few snippets about who I am professionally, what I bring to Concepts, and the things that make me tick". The course was designed so that students will organise weekly group discussions by themselves at the time that suits their group members best. They among themselves will chair the discussion, share/allocate work, facilitate the discussion, and take minutes/notes. In the assessments, students are given autonomy to choose their own concepts, use theory and evidence to examine how the concepts have been understood (conceptualised) in the literature and in practice. From there they analyse how the concepts have been enacted in their own practices, and suggest one detailed recommendation how the concepts could be integrated into an identified area of rehabilitation practice. The course was designed so that students can take responsibilities in their learning and assessments. The friendly language and discourse are used to reduce the gap in power distribution between students and teacher. This is a good achievement in the journey of mana-enhancing/empowering students. This journey will be continued, and the next step of the journey could be on (1) giving students more autonomy/ getting students input into the marking rubric and (2) providing students with opportunities to decide/contribute to the learning resources and suggest learning activities.

Principle 3: Time has to be allowed to build relationships

Learning is a social process (Nguyen et al., 2020). This learning process depends on interactions and relationships between students and social agents in a social network. Building positive, constructive, and reciprocal relationship takes time and effort. It is developmental and normally begins with getting to know each other, our views, and background. Trust is essential for learning in networked relationships. Particularly in knowledge intensive networks, trust is based more in informal social bonds, "reciprocal intricacies of transverse networks of information exchange", and less on hierarchical relations (Hodgson & McConnell, 2019, p. 47).
Relationship building is a focus of the course design. It starts in Week 1 in an online environment, when everyone gets to know each other through an ice-breaker activity (Fig. 4). The teacher introduces himself and tells students a bit about his professional life. He invites students to join in, introduce themselves and their work practice, share why they attend the course and what they would like to achieve, and reply to people especially with ones who share interests and connections.

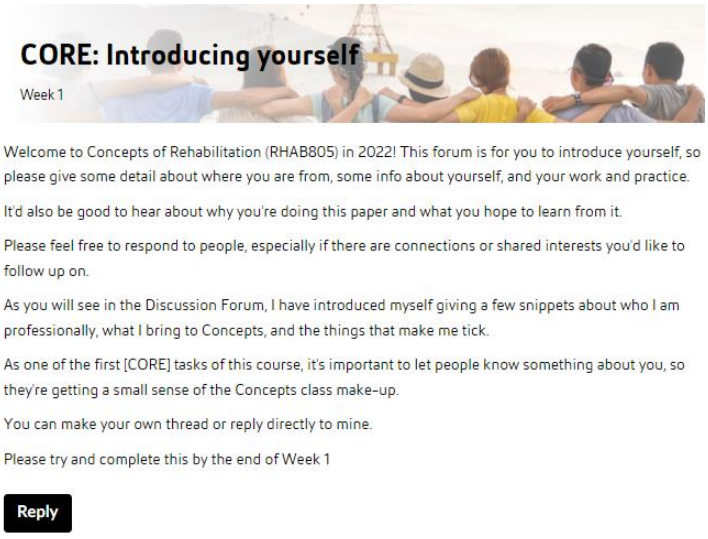

Figure 4: Ice-breaker in Canvas Discussions

Students are provided with opportunities to get to know each other better in a full-day face-to-face workshop with online access in Week 2. Whanaungatanga/ building relationship is one of the main purposes of the day. Students form groups, get to know their group members, discuss initial concepts that they want to research, come up with questions that they need to address, and set up times and spaces (online or face-to-face) for weekly discussion

session. They then meet weekly for another nine weeks to discuss the topics, with guided questions provided by the teacher.
With well-intentioned and careful design, reciprocal relationships, trust, and sharing will hopefully be developed during the semester when students study the course.

Principle 4: Learning is situated and context dependent

Learning is situated in contexts and activities, cannot be separated from practice (Greeno, 1997; Lave & Wenger, 1991). Learning and knowing ground "coherent action with respect to the context, purposes, history and needs of the situation" (Hodgson & McConnell, 2019, p. 47). Context influences who we interact with, and what our interactions and problem-solving approaches are. Each context will be shaped by and shapes our thoughts and actions.
A series of learning tasks in this course were designed so that students' learning is situated in context of their practice and learning activities. For example, students engage with the readily understood and familiar concept of trust in the context of their professional practice, activities, and assessment task. They read learning resources and make sense of the information in the context of their clinical practice to help understand how they might apply the same kinds of analyses to less familiar concepts. In the weekly group discussion, their group will discuss the concept of trust based on the below guided questions. They will then co-construct the discussion minutes/notes. Students can then use input from the discussion for their Formative Assessment 1 and their Summative Assessment. These questions are designed to support students connect their learning in the course with their clinical practices.

- How did the paper on the concept of trust allow you to further reflect on trust within healthcare?
- What stands out in the concept analysis as an example of the task you will be expected to do?
- Trust can be built up, broken, shared, passed on from one person to another (almost like a currency) - how have you experienced each of these things in your clinical practice?
- Have there been times that patients/clients have come to you with a lack of trust in your profession? How did that feel? What did you do in response? What options did you feel were option to you?
- Why is trust needed in healthcare?
- What can we do to ensure that trust is maximised within the therapeutic encounter?

Principle 5: Learning is supported by collaborative or group settings

Hodgson and Mc Connell (2019) argued that collaborative group work is considered as a main pedagogical method for networked learning. Collaboration assists students to share ideas, clarify thinking through conversation, develop interpersonal and critical thinking skills. It helps to provide a learning environment where students can take control of their own learning, develop argument, and get input from multiple perspectives. The group task - weekly discussion and co-construction of discussion minutes/notes - which was discussed in Principle 4, also reflected this principle. It was designed to provide students with opportunities to take control of their learning, share ideas, form arguments, and clarify thinking through verbalising. These group tasks provide students collaborative learning opportunities throughout the semester. These groups can potentially become a professional practice community or network, where collaboration and relationships go beyond the boundary of this course/programme to wider professional community, and last much longer than the 12-week semester. While collaboration and group work can benefit learners greatly, group interaction, collaboration, and inter-human relations can be seen as challenges by some students (Cutajar, 2016).

Principle 6: Dialogue and social interaction support the co-construction of knowledge, identity and learning

From a networked learning perspective, learning occurs through relational dialogue with online resources and social agents in learning network and communities (Hodgson & McConnell, 2019).

> Networked learning aspires to provide a space and a place for dialogue and interaction that not only supports the co-construction of knowledge, identity and learning but also where this co-construction is exposed to critical analysis and reflection that acknowledges ongoing uncertainty. (Hodgson & McConnell, 2019, p. 48)

The design intention of the course "Concepts of Rehabilitation" was that students co-construct knowledge and shape their identity within a given social and cultural context through dialogue. Dialogue supports students to articulate their knowledge and social and cultural experiences.
Dialogue in both online and physical environments are interwoven and support each other. Dialogue in online environment (the ice-breaker discussion) feeds into dialogue in the face-to-face full day workshop with online access. These interactions will in turn enhance the quality of the online/face-to-face dialogue that will happen in the later weeks. They also diminish the boundary between the online and physical environments so that the learning environment becomes a transverse network.

Principle 7: Critical reflexivity is an important part of the learning process and knowing

Critical reflexivity is an essential feature of students' learning. In the learning process, students reflect on their own practice and understanding. They question and challenge existing practice and systems. Reflexivity does not only focus on current learning, but also goes beyond the immediate learning context.
This course design aims to develop students' critical thinking, through questioning taken-for-granted assumptions. Their reflexivity is developed by examining their own beliefs and practices, and questioning current assumptions and practice of the health care system. The design of the assessments fosters students' critical reflexivity (see Summative and Formative Assessments sections). The seven guided questions in the "About the course" section also reflect this intentional design. Some of the questions are noted here to demonstrate the points.
Guided questions for student discussion:

Presuming most practitioners primarily rely on the medical/individualistic lens.

- In what ways does your practice benefit through its use of the lens it does? In what ways can it risk marginalising patients (and staff)?
- Thinking about your practice environment from arrival through to discharge, what would it be like for a Deaf patient to negotiate? Where would the gaps be? What assumptions are made? Whose concerns are prioritised?
- What can we do to ensure that trust is maximised within the therapeutic encounter?

Principle 8: The role of the facilitator/animator is important in networked learning

Teachers for a networked learning perspective are facilitators who interact with social agents in the network and support students through learning experience. Teachers as facilitator design the course, students' learning journey, and structural and coherent learning tasks. They reach out to experts in the field, build rich learning resources, enlarge and enrich the learning network and social agents in it. They enable and facilitate interactions and dialogue among students, social agents, and learning network. They empower students, enhance students' reflexivity and autonomy. They coach students to become self-directed life-long learners in a networked learning environment where digital and physical environments are entwined.
Going back to the Week 4 example, students learn about models of disability and constructive functional diversity. The teacher as a facilitator/animator interviewed Philip, an expert in the field, video recorded the interview, put it in Canvas and utilised it as learning resource. He also employed the video "Deaf Health Stories", a research output for colleagues at the same university. He designed and facilitated a series of scaffolding learning tasks:

- starting with watching/reading resources to get initial understanding of new knowledge on three models of disability and constructive functional diversity,
- then discussing with the group (facilitated by guided questions) about the topics in relation with students' clinical practices
- writing the ideas for Formative Assessment 2: Critical analysis of their own rehabilitation practice
- getting feedback from the teacher and revising the writing
- using this piece of writing for Part Two of the Summative Assessment

In this paper, although the eight principles were discussed in turn, they are interrelated and support each other. One design element of a course can reflect a group of principles, and one principle can be visible in different design elements. For example, the design of weekly group discussions in this case study reflects the essence of Principles 1 to 8 of design for networked learning. Principle 1 - learning which has a perceived value to the learners - underpins various design element such as homepage, weekly narratives, learning outcomes, discussion tasks.
Many students in this postgraduate course are working professionals. They bring in their experience to the course. Drawing on this, the design of the course focuses on learning which has a perceived value to the students and contextualises the learning. The online environment, the workshop day and discussion groups are designed to build

relationships and create opportunities for dialogue - facilitated by the teacher with resources and guiding questions. The design of the assessment scaffolds learning and facilitates co-construction and stimulates critical reflexivity. The current course design aims to empower students and provides them with opportunities to take shared responsibility in their learning process. Further enhancement can be to support students to take on even more responsibilities. For example, students can be partners in the course design. They can specify session/weekly learning outcomes, build/give input to the marking rubric and learning activities, add/contribute discussion questions and topics, bring in resources and their own networks.

Limitation and Conclusion

The paper has illustrated how networked learning design is unpacked in a health science course. It links theories and practice in a specific context of the course design. The eight principles of design for networked learning have been discussed and examined in relation to the design elements. It is recommended that networked learning and these principles should be implemented in similar contexts and experimented with in different contexts. Although the eight principles have many strengths, the implementation of these principles can be challenging as outlined in the later paper of the symposium.

The current paper focusses only the design of the course. It does not include the evaluation of the course with students' feedback, observation, and data. It is proposed that future studies should focus on the course evaluation, students' learning experience, teacher's experience, and feedback from students and teacher on the course design.

Digital and physical worlds in this case study are entwined, and the boundary between the two worlds is blurred. Online and face-to-face learning environments are entangled and complement each other. These learning environments merge into a transverse network, in which the online and physical elements with social agents amalgamate together.

In this network, students' learning relies upon their engagement in valued activities that are situated and contextualised, and in a learning environment that cultivates connections between themselves and other social agents. Students are enabled to operate as a learning community in which individuals are connected to one another and to the resources of the community. Critical reflexivity is part of the design. Learning is designed and facilitated to support collaborative reciprocal co-construction of meaning and identity.

Ponti & Hodgson (2006) used these principles for small and medium enterprise management development. This case study suggests that the design for networked learning principles can be used in the context of a health science course at postgraduate level. While networked learning principles were strongly resonated throughout the course design, it is suggested that students can take on more responsibilities for the learning process.

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How can Networked Learning promote student-directed learning at AUT?

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Abstract

Auckland University of Technology (AUT) is a young university in Aotearoa New Zealand, focusing on the student experience. This paper looks at the learning environment in that context and questions where networked learning principles could contribute to the strategic goal of student-directed learning. The paper explores central notions in networked learning as strengths and weaknesses, and redefines student-directed learning for the context of AUT.

Keywords

Student-directed learning, Networked learning, higher education, learning design, SWOT, dialogue

Introduction

In the previous symposium contributions, we discuss design principles taken from the Networked Learning framework for the course level and a case study illustrating an initial implementation. This paper focuses specifically on designing the student experience on an institutional (policy) level in the context of a higher education institution in Aotearoa New Zealand and how a networked learning framework can inform that.

It makes sense to dedicate a paper in this series to the student experience, as this is central to AUT's mission of creating Great Graduates. After situating AUT's learning and teaching framework in detail, the paper specifies strengths and weaknesses of incorporating networked learning principles for student-directed learning and formulates opportunities for the AUT context. Rather than adding threats, the paper formulates areas for further research where these suggestions are implemented. Paper 4 details future research in more detail.

AUT's strategic priority: the student experience

As discussed in paper 1, Auckland University of Technology (AUT) is a young dynamic university with a strong tradition in Aotearoa New Zealand. It has chosen the student experience as a strategic priority and conceptualises that priority by offering so-called exceptional learning experiences. Creating exceptional learning experiences is

the first theme in AUT's strategic directions and central to that strategy is designing student-directed learning. According to AUT Directions to 2025 (AUT Directions, 2019, p.2) student-directed learning enables students to:

> - Explore and build programmes from broad curricular and co-curricular options (…). Students' options will include modes of delivery and engagement.

Student-directed learning at AUT means that students will be offered choices to build individualized programmes, whereby there are explicit expectations to the quality of the programmes ("high quality, relevant, supported with effective learning and teaching services") as well as the teaching ("creative, interactive and responsive, characterised by its contemporary approaches, technologies and resources" and teachers' expertise).

> - To enhance their sense of purpose and confidence, and their employability and enterprise skills.

The aim of student-directed learning at AUT is broader than for students to be educated and employable, and additionally aims to "gain core and transferable skills with which to navigate the shifting opportunities of work and enterprise and contribute in all aspects of their lives" (AUT Directions, 2019, p.2).

So far, this strategy has proven successful, making AUT the second largest university in New Zealand and ranked among the top 1% of universities in the world (Times Higher Education, 2021). Moving forward, AUT continues to prioritise designing student-directed learning as a strategic goal (Morris, 2019) and therefore looks at the (formal and informal) learning environment. Where strategic directions focus on creating (high-quality) options for students with the clear goal to enhance their career competences and employability, the networked learning framework further specifies the learning environment that develops students' ability to optimally make those choices. This leads to this paper's problem identification: *How can networked learning be used to further student-directed learning (AUT strategic goal)*?

Student experience framework at AUT

At the institutional level, the pedagogical agenda is formalised in the Xceptional Learning Experiences (XLE) framework, illustrated in Figure 1 (AUT, 2019). Central is the student experience, that is contextualised (work and social connection) and collaborative (interdisciplinary collaboration) and aimed at learning for living (authentic assessment). We will discuss this framework further in more detail.

Figure 1: AUT's XLE framework (AUT, 2019)

The new strategic directions coincide with a review and adoption of a new learning management system (LMS) at AUT. An institution-wide change of LMS is not a small change, nor something an institution does often. Given the rare opportunity to affect a wider change, AUT has chosen to support the implementation of the new LMS with a Canvas@AUT Change Approach as a "once in a generation opportunity to align a pedagogical reform agenda with key infrastructure updates" (Canvas@AUT, 2021a, para 2). It involves the development of all AUT courses by development teams made up of Course Leads and supporting Learning Designers, Learning Technologists and Digital Media support staff and has the potential to transform the AUT learning experience.

The goal with the implementation of this new LMS is to enhance student engagement in their online learning environment. Although flexible for variation in requirements at the individual course level, the implementation of the new LMS is driven by 10 principles reflecting the institutional priorities. Among these principles is to support the student learning experience (clear and accessible structure for learners to navigate and orientate), active learner participation (learners are encouraged to share their learning resources, interact with each other, and participate in activities) and communication (consistent online communication with and between learners and online teacher presence to help learners feel connected to a community of learning) (Canvas@AUT, 2021b).

Both the XLE framework and the Canvas principles are designed to enhance students' learning experiences at AUT. Taken together they provide a framework for blended learning at AUT, (further) embracing opportunities of the online learning environment. This has become particularly relevant university-wide under the impulse of the global pandemic.

Networked Learning: principles for practice

The AUT context described so far is distinguished by attention to (at least) three sets of phenomena (based on NLEC, 2021):

- collaborative engagement in valued activity: XLE framework that shapes our view on formal and informal learning (see Figure 1)
- technology: new LMS providing the infrastructure for modern blended, technology-mediated learning
- interpersonal relationships: situated in Aotearoa New Zealand, our university community is strongly influenced by mātauranga Māori (Māori knowledge and world view) where establishing relationships or whakawhanaungatanga is key

We look at Networked Learning as a field of research and practice that could further inspire AUT's learning environment because the combination of these phenomena is the focus of the field of Networked Learning. That field is broad, as Networked Learning has amassed multiple definitions over the years and with the evolution of technology, to suit the particular use/context. For the scope of this symposium, we start from the Networked Learning Editorial Collective's suggested definition of networked learning (NLEC, 2021) as:

> A view of learning that relies upon actants' engagement in valued activities that are situated and contextualised, in a learning environment that cultivates connections between the actants. …
> => aligns with our XLE's Work and social connection
>
> The actants operate as a learning community in which individual actants are connected to one another and to the resources of the community and where critical reflexivity is practiced by the community. …
> => aligns with our XLE's Interdisciplinary collaboration
>
> Networked learning is designed and facilitated to support collaborative reciprocal co-construction of meaning, identity and other products which represent 'learning'.
> => aligns with our XLE's Authentic Assessment

This definition at first glance seems to align with our learning and teaching framework. Our central question is how networked learning can further promote student-directed learning at AUT. Can we find inspiration in networked learning to further AUT's learning and teaching framework? In what follows, we will explore networked learning principles for our particular use (student-directed learning) and context (a specific higher education institution in Aotearoa New Zealand).

Principles for AUT practice

Our starting point are the eight principles for networked learning as developed by Ponti and Hodgson (2006, in Hodgson & McConnell, 2019) and discussed in the first paper. In table 1 and the discussion that follows, we connect the networked learning principles to the Xceptional Learning Experiences (XLE) framework and discuss its merits and challenges for student-directed learning, both from a theoretical and practical point of view.

Focus	Networked learning experiences	Roles and responsibilities in networked learning	Networked learning outcomes
AUT context (XLE)	Work & social connection	Interdisciplinary collaboration	Authentic assessment
Principles underpinning networked learning designs	Learning is *situated* and *context* dependent.	Learning is supported by *collaborative* or group settings.	Dialogue and social interaction support the *co-construction* of knowledge, identity and learning.
		Responsibility for the learning process should be *shared* (between all actors in the network).	
	The focus is on learning which has a perceived *value* to the learners.	Time has to be allowed to build *relationships*.	Critical *reflexivity* is an important part of the learning process and knowing.
		The role of the *facilitator*/ animator is important in networked learning.	
S	Dialogical learning environment Emancipatory transformation	Shared responsibility for learning: - stages - students as critical participants, teachers as facilitators	Lifelong learning and agency
W	Tradition of knowledge transfer (one-directional) Pressure to conform	Student and teacher perceptions	Time and resource consuming
O	*Learning experiences*: Active learner participation + resources Accessibility + inclusivity	*Expectations for learning/participation*: Orientation Teacher presence	*Feedback*: Assessment Communication
T	Contributes to perceived value?	Contributes to active learner participation?	Contributes to learning?

Table 1: Networked learning principles for AUT practice.

Although we acknowledge that it is the combination of the principles that makes up networked learning, for the purpose of this paper we look at the networked learning principles under those 3 foci.

FOCUS 1 - Networked learning experiences

Learning experiences are central to AUT and the focus is on curating work and social connections. The XLE framework focuses on work and social connections through work-based and problem-based learning: "Connecting students with industry/professions/community/iwi through a range of internships, practicums, work integrated learning, inquiry and research" (AUT, 2019). The networked learning principle that learning is situated and context dependent echoes that position. Additionally though, the principles specify that the focus is on learning which has *perceived value* to the learners. Let's explore that notion in depth, for the strategic goal of student-directed learning.

There is strong support from the literature for this principle, although the implementations in practice vary from pragmatically including the real-world relevance of subjects hoping students perceive their value to more fundamental ways as illustrated by Meijers (2013) in his introduction to the special issue of the International Journal for Dialogical Science:

> In order for education to be truly meaningful for students and teachers alike, educational environments must be developed where (a) experiential learning is considered key (b) conversations take place about the personal and societal meaning of concrete experiences in all life domains, and

> (c) theoretical knowledge is offered “just in time and just enough” based on questions that students and teachers need to have an answer to (Meijers, 2013, p4).

Research shows that developing students' ability to make choices for employability as well as life-long and life-wide learning (Savickas et al., 2010) requires a learning environment that combines relevant experiences (Dewey, 1960) with a dialogue about the meaning of those experiences (Meijers & Lengelle, 2012; Kuijpers & Meijers, 2012), as well as theoretical knowledge. For students to attach meaning to their experiences and use that as the direction for their learning, learning environments need to become dialogical learning spaces where personal connections, both cognitive and interpersonal, are valued.

However, subsequent research showed that learning environments, even those with rich curated experiences, are still very traditionally organised around information transfer to students (monologic), and that changing that requires a paradigm shift (Kuijpers & Meijers, 2017; Winters et al., 2012; Draaisma et al., 2017). Lane (2016) has made similar observations for learning management systems that focused much more on the content and content-delivery systems than on how the classroom or educational process can be co-constructed.

For AUT, networked learning can be a relevant addition here by advocating the importance of dialogue to enhance the perceived value for students of their exceptional experiences. On a curriculum level, when students connect with work (industry/professions) and social (community/iwi), do we provide dialogical spaces to discuss the meaning for the student of those experiences? On a course level, do we provide resources to the students, or design learning activities for the students?

Ideally the learning environment allows for connecting with students on a personal level, accepting their frameworks and discussing the meaning of experiences from different perspectives. A dialogical learning space is described as collaborative and aiming to co-construct and negotiate meaning (see further), and it values personal connections. Especially with the focus of student-directed learning, that deems the question: whose experiences, whose connections, whose problems (in PBL), and whose values (in Aotearoa)?

Networked learning has an emancipatory element in it, going back to Freire (1970) positioning education away from a particular model of delivering information (where the educator shares a point of view, a primary source or a piece of interpreted information), to a dialogical process between teacher and students (Nguyen, 2019). Aspiring this is especially relevant for us in the context or Aotearoa New Zealand, with strong values based in mātauranga Māori. Whakawhanaungatanga, for example, is the process of building relationships "through shared experiences and working together which provides people with a sense of belonging" (Māori Dictionary). But in practice it is challenging trying to co-construct meaning. Several authors (e.g. Perriton & Reynolds, 2013; Hodgson & Reynolds, 2005) have written about how differences and inequality almost inevitable lead to practical and ideological pressures to conform rather than negotiate meaning.

For AUT on a curriculum level, networked learning reiterates the importance of including (awareness for) all perspectives. For the course level, we wonder whether the use of networked technologies as part of the learning environment may provide additional opportunities to shape the dialogue (e.g. Peacock & Cowan, 2017; Ravencroft, 2011; Silva et al., 2013). Learners are encouraged to participate and interact with each other, and share learning resources. These resources have strong ties to community and practice and are optimally accessible and inclusive.

From the above initial exploration, we propose a redefinition of AUT's strategic priority: Designing student-directed learning at AUT means designing a dialogical learning environment that develops students' ability to transform valued experiences through situated and context dependent learning into new knowledge.
Future work includes researching, upon implementation of these principles, how this contributes to perceived value (for students and teaching staff). Case studies, detailing the implementation of networked learning principles described here, would work well for this intention.

FOCUS 2: Roles and responsibilities in networked learning - interdisciplinary collaboration
In discussing a networked learning environment for student-directed learning, there are expectations for the roles and responsibilities of all those involved. The XLE framework focuses on interdisciplinary collaboration: "Immersing students in inter-disciplinary/bi-cultural/inter-cultural ways of knowing, doing and being that focus on problem-framing and collaboration" (AUT, 2019). Learning as collaborative process is a networked learning

principle as well. We emphasize the role of shared responsibility over time and the teacher as facilitator for student-directed learning.

Shared responsibility for the learning process is - in itself - part of a collaborative dialogue that can include contacts from professional and personal networks. It broadens the student experience and brings in additional perspectives. Garrison (2011) refers to communities of learning where individuals "collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding" (p.15). We have mentioned higher how this concept of community of learning is problematised, however consistently described as critical in the literature about learning. So the question becomes how to get it right.

It is important to allow time for relationships to develop. Networked learning is achieved through participation in a collaborative dialogue where responsibilities are scaffolded and negotiated between all those involved. Meijers and Kuijpers (2015) distinguish phases in that development, from a division of responsibilities where all actors do their thing in the learning process without explicit arrangements about expectations, over learning together and designing together based on agreed responsibilities, to eventually innovating together as true shared responsibility for the learning process. It is where students have the potential to co-design and co-create their curriculum. Cutajar (2014) describes categories in the student experience of networked learning, from supporting access to resources and individual self-managed learning, to learning in connectivity for increasing personal learning and eventually a consciousness of facilitating others' learning as well.

For AUT, design principles at the course level include helping learners orientate themselves by outlining how they are expected to learn and engage. The networked learning perspective can be a relevant addition for the curriculum level by advocating the importance of relations that have the opportunity to grow over time and scaffolding responsibilities for students.

With the focus of student-directed learning, the expectation is that students learn to take on the role as critical participants and agents of their own learning (Freire, 1970) with the teachers as facilitators curating connections/ resources/experiences, providing focus for learning experiences and stimulating dialogue and reflection (Christian et al., 2020). Student-directed learning implies growing autonomy for students regarding the choices they make, to develop their ability to give direction to their careers. To be able to support that, the learning environment needs options/choice as well as guidance/dialogue to make those choices.

However, Healey et al. (2015) note that these roles and responsibilities require "a significant shift in the way that student and staff roles are conceptualised towards a more constructive, dialogue-based relationship between staff and students" (p.143). Digital tools could empower students, as they can curate and share content and networks, but they are mainly a tool. Crucially the role expectations need to change, and research evidence points out that that is challenging in practice: e.g. because of the need to avoid the image of experts yet keeping a critical stance whilst building a close relationship with the community of learning (Margalef & Pareja Roblin, 2016).

At AUT the learning management system facilitates teacher presence to give learners a sense of belonging and help them feel connected to a community of learning. Networked learning broadens the design principles here to include a growth perspective where the student and teacher role is clearly outlined and scaffolded over time.

From the above, we again propose a redefinition of AUT's strategic priority: Designing student-directed learning at AUT means designing a collaborative dialogical learning environment that through shared responsibility over time develops students' ability to transform valued experiences through situated and context dependent learning into new knowledge. When implementing these principles, future work includes case studies researching how this contributes to active learner participation (for students and teaching staff).

FOCUS 3: Networked learning outcomes - authentic assessment
In designing for (networked) learning we consider the desired outcomes again, going back to AUT's strategic priorities. AUT wants great graduates, with a focus on student-directed learning for employability and purpose. The XLE framework focuses on authentic assessment: "Evidencing student learning that matters outside the classroom and equipping our students for learning beyond the university" (AUT, 2019). From the networked learning principles, we emphasize the role of co-construction of learning and critical reflexivity for student-directed learning.

In networked learning, what is being assessed is students' learning for living, life-long and life-wide (Law et al., 2002). It includes academic knowledge, as well as identity and career learning (Geijsel & Meijers, 2006) and aligns with AUT's focus of learning for employability and purpose. That learning is co-constructed, with opportunities for students to include their personal connections, and requiring student agency as we mentioned higher. As for how to assess, Costa and Kallick (2004) propose assessment strategies for self-directed learning assessing students' progress towards becoming self-managing, self-monitoring and self-modifying:

- Self-managing = the willingness to be engaged in activities with awareness of the results for their learning and the academic load, and essential information they need, and use of prior experiences, looking forward to signs of achievement, and generating substitutes for accomplishment
- Self-monitoring = having adequate self-awareness about what is effective, employing cognitive and metacognitive strategies to assess their learning
- Self-modifying = thinking over, assessing, and constructing meaning from experience and utilizing their knowledge to future activities, and tasks

Assessing self-directed learning is essential in developing life-long, self-initiated learning habits and critical reflexivity. For example, Trede and Jackson (2021) discuss a critical transformative stance to students' work integrated learning (WIL) experiences and emphasise how reflexive debriefings are important to foster agency and development. These debriefings, or feedback for learning, are dialogical in nature providing an engaging learning environment.

At AUT authentic assessment is a fundamental aspect of our learning and teaching framework. In design principles the assessment requirements need to be clear and relevant. Networked learning can add to that by embodying the crucial role of formative feedback, as dialogical communication.

Authentic assessment tends to move away from summative testing, towards continuous evidencing learning and formative feedback. Feedback provides the students with the opportunity to learn how to reflect on their learning (Hounsell, 2003). Designed right, the LMS can serve that dual purpose: providing both a dialogical space for feedback and a platform for showing formal and informal learning outcomes. Plenty of case studies outline the advantages of this view on learning and assessment, however the process is more resource and time consuming and this is an important potential road block for implementation in practice.

Including these reflections, our final proposed redefinition of AUT's strategic priority in this paper: Designing student-directed learning at AUT means designing a collaborative dialogical learning environment that through shared responsibility over time develops students' ability to transform valued experiences through situated and context dependent learning into new knowledge as co-construction and develops critical reflexivity for evaluating and examining the learning process and resultant actions. When implementing these principles, future work includes outcome studies researching how this contributes to actual learning.

Conclusion - Designing the student experience at AUT

This paper explores how networked learning can promote student-directed learning, a strategic priority at AUT. To answer our leading question for this paper we have discussed networked learning principles taking 3 foci from the XLE framework, resulting in a redefinition to suit AUT's context and use for student-directed learning:

Designing student-directed learning at AUT means designing a collaborative dialogical learning environment that through shared responsibility over time develops students' ability to transform valued experiences through situated and context dependent learning into new knowledge as co-construction and develops critical reflexivity for evaluating and examining the learning process and resultant actions.
Through our exploration of the literature, dialogue has emerged as a central notion. The (renewed) attention for dialogue proposed in networked learning helps to meet AUT's strategic goal of student-directed learning for employability and career learning: a dialogical space where students can include and discuss experiences that are of value to them, curate and share resources and networks as their responsibilities grow and make choices, and co-construct knowledge in engaging discourse with feedback for learning. Our recommendation is to consider refinements to the XLE framework at the program/institutional level and organise a collaborative dialogue to discuss shared responsibility with students, teaching staff, professional and research connections and management.

However in the translation to practice, we anticipate friction when it comes to the ability to make a shift to a curriculum that not only pushes for exceptional student experiences but is designed with space to discuss and value these experiences and students' informal learning and connections (pragmatic). We wonder if students are prepared to take on the suggested pro-active role in learning and if teaching staff is equipped to support this type of learning (motivational). And our main concern is organising this in a way that gives opportunities to all students (equity).

The papers making up this symposium see Eberhard et al. discuss priorities in designing for networked learning at the course level, depending on the course context, requirements and experiences. In a case study for a Health course, Nguyen et al. take these elements as design principles and apply them at the course level. And Sim et al. set out our research agenda proposing an interpretivist method to understand teaching and learning experiences once these design principles have been implemented within our higher education institution.

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Networked Learning: Classroom Experiences at AUT

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Abstract

This short paper describes a proposed case study which aims at exploring to what extent Networked Learning enhances classroom experiences at the authors' institution and how the authors' institution could adopt networked learning in producing Great Graduates, the authors' institution mission. The case study is significant with the re-definition of Networked Learning within an institutional context. The study employs an interpretivist research approach (Erickson, 1998) with a combination of direct observation and interview-like methods to understand the experiences of students and teaching academics in on-campus Networked Learning situations among all 15 study options at the authors' institution. Participants will include volunteered students and academics from various disciplines. The literature review indicates that the adoption of Networked Learning in classroom boosts students' self-efficacy for social networking and professional development, enhances student-centred experiences with a community focus (e.g., social presence) and provides opportunities for students to further develop their critical thinking. The changing landscape of higher education, especially in this post global pandemic era, warrants the development of a case study approach within a particular context in order to further investigate the adoption of Networked Learning in enhancing teaching and learning processes. The findings will gain insights into achieving the strategic goal of student-directed learning at the authors' institution and could be applicable to higher education in general in order to improve teaching and learning experiences further. In short, it is an iterative process of developing one's own Networked Learning application through the affordance of the Networked Learning principles and the practical accomplishment of teaching and learning practices at the course as well as the programme level. Limitations and possible future study are being identified from this proposal.

Keywords

Case Study, Higher Education, Networked Learning, Student Experiences, Teaching and Learning

Context

The notion of Networked Learning in education has existed for years and the word 'Networked' denotes the idea of 'digitally mediated'. However, Networked Learning moves beyond false dichotomies, which describe digital and physical spaces as somehow 'opposite'. There is certainly a large overlap in having both spaces intertwined

into the notion of teaching and learning but Networked Learning allows more ‘complexity’ when it is being adopted in the process of teaching and learning. The classroom experiences that adopt Networked Learning are not a single theoretical unity nor a particular pedagogical standpoint (Lee, 2018). In fact, Networked Learning in this context is an open and diverse conceptual idea that is highly critical, where “learning should be designed in such a way as to increase learner agency, drawing on and nurturing learners’ motivation to learn” (Blaschke, Bozkurt & Cormier, 2021). In other words, Networked Learning is student focused and student driven.

Rationale

The changing landscape of higher education warrants further justification how we could utilise the underpinning values of Networked Learning in a globalised teaching and learning environment for much richer and varied participation where both teachers and students’ experiences could be enhanced. Therefore, the authors’ institution defines Networked Learning as "a view of learning that relies upon actants’ engagement in valued activities that are situated and contextualised, in a learning environment that cultivates connections between the actants. The actants operate as a learning community in which individual actants are connected to one another and to the resources of the community and where critical reflexivity is practiced by the community. Networked Learning is thus designed and facilitated to support collaborative reciprocal co-construction of meaning, identity and other products which represent ‘learning’" (Networked Learning Editorial Collective (NLEC), 2021). With such comprehensive institutional definition, it is beneficial to propose a case study to examine how Networked Learning could be taken on board in the actual classroom experiences within a specific context. The aims of the study are to investigate:

1. To what extent networked learning enhances classroom experiences at the authors’ institution?
2. How could the authors’ institution adopt networked learning in producing Great Graduates, the authors' institution mission?

Research Design: A Case Study Approach

The proposed study explores the use of Networked Learning in teaching and learning processes in different disciplines (15 study options at the authors' institution). The study employs an interpretivist research approach (Erickson, 1998) with a combination of direct observation and interview-like methods to understand the experiences of students and teaching academics in on-campus networked learning situations. Participants will include volunteered students and academics from various disciplines who respond to the invitation. Data will be collected through

a) Classroom Observation.
The focus of the data is to discover the adoption of Networked Learning in the teaching and learning process, especially if it aligns with the proposed Networked Learning principles in the authors’ institution. Through observing the participants in the classes, the study captures how the academics incorporate Networked Learning in their teaching and to what extent the practice has an impact on student learning (e.g., student engagement).

b) Follow-up interview/discussion.
During this interview/discussion, the participants will be invited to talk about their classroom experiences. Each academic will be asked to explain the notion of Networked Learning in their classroom, and how Networked Learning has been included in the teaching and learning process. Simultaneously, students will discuss their classroom experiences and to what extent the teaching practice has an impact on their learning.

All interview/discussions are audio recorded and transcriptions of the recordings are returned to the participants for checking. In line with the broad interpretive approach that frames and governs this investigation, the data will be analysed shortly after they are gathered. Analysis of the data contributes to the development of ideas about the perceptions held by the participants, and these are refined progressively across the instances that authors meet with participants. The identified perceptions are thus checked and rechecked and refined against observation data set as it is collected. This iterative and inductive approach (Thomas, 2006) involves thematic analysis (Silverman, 2001) and the capture of major and common ideas (Mayring, 2000) expressed by participants about how Networked Learning is adopted in the teaching and learning process. This approach helps to operationalise a process of co-construction between the researchers and the participants. Through checking and rechecking, refining and confirming, the authors are able to articulate their understanding of the perceptions held by the participants that match the participants’ expressed perceptions.

The outcomes of the analysis process are a series of assertions about the ways Networked Learning is perceived and understood in the teaching and learning process in order to answer the above mentioned research questions.

Discussion

Based on three main themes which have emerged in the recent literature, as mentioned this case study approach is proposed to unpack the adoption of Networked Learning in a specific institutional context in order to answer the above-mentioned research questions.

Firstly, research shows that the adoption of Networked Learning in classroom boosts students' self-efficacy for social networking and professional development (e.g., Anders, 2018). For example, one of the studies argues that Networked Learning "that integrates a professional context into the learning experience" could "promote self-efficacy and skill to learn" (Ashar, Kamdi & Kurniawan, 2021, p. 202). Therefore, a context specific study is needed to examine the applications of Networked Learning that integrate professional contexts (i.e. relevant industrial and/or social domains) into teaching and learning. This is particularly useful when 'Work and Social Connection' is one of the key components in the teaching and learning framework at the authors' institution.

Secondly, research reveals that Networked Learning use in classroom enhances student-centred experiences with a community focus (e.g., social presence). Networked Learning in this form takes advantages of the flexibility of space, especially amid the current global pandemic, in order to establish a borderless community exposure. For instance, "it turned out that everybody involved, teachers, [students] and citizens, began to collaborate through network mediated by online app, tools and services and adapt to the circumstances according to their actual knowledge and to develop new knowledge in collaboration" (Gislev, Thestrup and Elving, 2020, p. 275). The community focus is particularly significant at the authors' institution when the Learning and Teaching Roadmap to 2025 emphasises student experiences to be shaped through a deep connection to work, communities and iwi (tribes). Therefore, further research within a specific context is necessary to investigate how Networked Learning could also make use of the flexibility of time and space for community enforcement due to the 24/7 connectedness, via all the institutionally provided digital platforms, in order to enrich student learning experiences.

Lastly, research unveils the fact that Networked Learning provides opportunities for students to further develop their critical thinking, which is an important 21st century competency. A recent study shows that critical thinking within Networked Learning is embedded "through dialogue with fellow learners to consider other perspectives and negotiate and critique ideas and arguments" (Koh, Jonathan & Tan, 2019, p. 287). Therefore, this proposed research within an institutional context is crucial to explore the recommended practices for teachers to turn this critical gaze onto Networked Learning acquisition in a classrooms setting. This is particularly important when the authors' institution aspires to produce Great Graduates with an emphasis on being able to Care, Question and Act. With that, critical lens is necessitated for the ability to Question.

Implications/Significance

Apart from answering the two research questions, this proposed case study aims to generate insights into the application of the eight networked learning principles as part of an institutional approach for implementing Networked Learning at the course as well as at the programme level, as presented in Paper-1. Further, the case study will determine the extent of Networked Learning adoption in achieving the strategic goal of student-directed learning at the authors' institution, as highlighted in the study in Paper-2. Aligning with the essence of Paper-3, this project is essential in enabling the authors, who work in the central teaching and learning unit, to support the institution in enhancing teaching and learning experiences constantly.

In Summary

Across and behind the different themes identified as recurrent, contemporary or emerging within the field of Networked Learning, the authors also see new ways of understanding the field itself emerging (Dohn, Sime, Cranmer, Ryberg & de Laat, 2018). Hence, it gives reasons for optimism regarding the development of a case study approach within a particular context in order to further investigate Networked Learning for teaching and learning process. However, the authors are aware of the limitations of the suggested case study. Although the literature review has elicited many advantages of Networked Learning adoption in teaching and learning process, it has not explored related features such as various factors that could be involved in potentially leading to the failures of Networked Learning application in the classroom setting. This provides a foundation for the possible future study depending on the findings emerged from this proposed case study.

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ROUNDTABLES

Negotiating Networked Learning Relationships with Augmentation Technologies: Smart Education, Data Analytics, and Human-autonomy Teaming

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University of Richmond

Isabel Pedersen

Ontario Tech University

Nupoor Ranade

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Jason Tham

Texas Tech University

Gustav Verhulsdonck

Michigan Tech University

Hosts: Members of the Building Digital Literacy research cluster of the Digital Life Institute

Elevator Pitch: The hosts of this round table discussion, members of the Building Digital Literacy (BDL) research cluster of the Digital Life Institute (www.digitallife.org), adopt a critical disposition (NLEC, 2021a, 2021b) toward emerging augmentation technologies that sit at the core of networked learning. Augmentation technologies, such as wearable devices that extend human senses, augment creative abilities, or overcome physical limitations (Pederson & Hill, 2021), represent the engine that drives the next generation of networked learning. As emerging augmentation technologies, use of data analytics, and "smart" technologies proliferate, we see the critical need for research, presentation, and discussion of the implications for networked learning. This round table invites conversation about the role of artificial intelligence, big data, and learning analytics in networked learning.

We situate this round table discussion within networked learning [NL] as (re)defined by the Networked Learning Editorial Collective (2021a):

> Networked learning involves processes of collaborative, co-operative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies…. Networked learning promotes connections: between people, between sites of learning and action, between ideas, resources and solutions, across time, space, and media. (p. 320)

Chris Jones writes that this NL definition "needs to emphasize the relationship to technologies, understood as socio-technical systems and to stress the role of digital networks as configurations that straddle both technical systems and human interactions—interactions between humans, between humans and machines, and in assemblages of both humans and machines" (NLEC, 2021b, pp. 331-332). We position networked learning as increasingly negotiated through augmentation technologies, and emphasize the need to negotiate networked learning relationships with augmentation technologies. We illustrate how NL is negotiated through augmentation technologies, and that such technologies are not necessarily convivial.

We seek to engage round table participants in addressing these and additional questions surrounding the role of augmentation technologies in networked learning. Brief remarks defining terms and narrating scenarios will precede each set of questions.

- To what extent do the connected technologies and educational approaches in smart cities engage residents in networked learning? What role do these technologies play in the assemblages that emerge to enable networked learning? What critical stance should be taken toward technological platforms inherent in smart cities and schools of the future?
- How are data analytics engaged in data collection from technological platforms, especially those embedded in networked learning? To what extent should data collected for analysis from technological platforms be accepted as accurate and representative of disparate users? How might networked learning both engage data analytics critically and use data analytics to gain insight in the activity and results of networked learning?
- What impact do algorithms, artificial intelligence, and machine learning have on networked learning? To what extent are humans augmented by these technologies, and to what extent are they hampered? How should we envision the future of networked learning when networked learning assemblages of human and non-human entities include artificial intelligences capable of non-programmed learning?
- To what extent should we consider the technologies addressed in this round table discussion as "convivial"? What pedagogical approaches might we propose to prepare citizens for a future where networked learning is increasingly mediated by artificial intelligence? What does the future of networked learning look like in an increasingly "smart" digital world?

Goal: We set the following goals for participants in this round table discussion:

- Emphasize intersections among the work of the BDL research cluster of the Digital Life Institute and the NLCC, especially centered around augmentation technologies.
- Continue research and collaboration to expand the definition of networked learning to include connections between digital augmentation technologies and people, especially around "smart" environments, data analytics, and autonomous agents.
- Invite NLC participants to engage in technical and professional communications (TPC) research, and TPC participants to engage in NLC research.
- Propose a professional research network (PRN) to explore connections among digital literacy, technical communication, and networked learning.

Engaging participants into the discussion: We plan to use Zoom to facilitate this round table discussion, enabling both in-person attendees and remote participants online to engage in this conversation. Following brief positioning statements for each set of questions listed above, we will engage participants in addressing these questions in as much detail, and with as much leeway for exploration, as time permits. We will take notes during the discussion and request permission to record the session to ensure that remaining questions and comments are addressed following the round table, especially if we're able to propose a PRN at the conclusion of the round table. We seek to learn from participants how they are thinking about augmentation technologies and the roles they play in networked learning theory and practice. We hope to facilitate and listen as hosts.

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Soft skills training for battery gigafactories 4.0

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Round table discussion about integration of soft skills training

We probably all agree that well developed soft skills are essential for any human to have, both in private social life and the workplace. However, it has recently come before our eyes (read below) that soft skills maybe even more in demand than hard technical skills, even for high-tech machine operators in Industry 4.0.

In this roundtable, we want to discuss how to integrate soft skills training in any course at any level of education. The participants inputs and contributions in discussion are essential for ongoing massive education and training development on the European level.

1) First, we want to exchange general and personal experiences and models for soft skills training among participants.

2) Then, we will shortly present the case we are working with, education and training development for battery cell factories, to discuss pedagogy and models in this "blend" between hard skills, academic knowledge and soft skills training. We here pre-suppose the ICT-integrated "blended learning" as a normality today (Dziuban et al. 2018), but now we want to blend in more soft skills training in this concept. We need the participant's ideas and sharing of experiences.

3) We will conclude the roundtable with a discussion on where Industry 4.0 and 5.0 trends may lead us, philosophically and pedagogically. We take help from innovative terminology in Floridi's Philosophy of Information (Floridi 2018). Today's automated manufacturing machines communicate with one another along the production line and constantly learn from production data through machine learning. In contrast to common beliefs, working together with robots, computers, and algorithms can maybe make us more human, not less? The current manufacturing development may not lead to "dark factories" but instead to very clean, light, social, problem-solving, creative, sustainable and social job environments (Industry 5.0). We may increasingly understand what exclusive human abilities are.

The background to our roundtable is the following:

Two of the authors coordinate a big European education development project, ERASMUS+ Sector Skills Alliances ALBATTS (Albatts, 2022), with 20 partners in 11 countries developing a "blueprint" for education and training for the battery and electromobility value chain in Europe. Sectoral intelligence, analysis of skills needs, new job roles descriptions etc are being developed, as well as curricula, learning material, learning concept pilots (as adaptive learning units) and train-the trainer solutions. Our results will be implemented as a service to European national education and training providers for designing customised national solutions. Already are national alliances between industry and education emerging to cope with these huge skills need ahead. To our slight surprise, the soft skills seem pivotal for job-seekers employability.

This transformation to green energy for transport will affect 3-4 million European jobs (Šefčovič 2021) in about the coming five years. The emergence of a European battery value chain is happening before our eyes in just a narrow window of time until about 2025-2030, and the demand for a trained workforce is vast, a lot more than can

be solved with up-and reskilling. However, we have no battery production experience before in Europe, and the production process is highly complex. First out in Europe is the gigafactory Northvolt Ett in Skellefteå, Sweden (Northvolt, 2021), ramping up production in the spring of 2022.

The project ALBATTS concentrates on education levels EQF4-5 mainly, the vocational education levels (operators and technicians). Northvolt Ett is commissioning in the spring of 2022. About 40 other European battery gigafactories are lined up to start in 2 to 5 years from now, each with the need for thousands of qualified workers. This European training challenge is monumental for European competitiveness. For technical skills training, there are advanced robotic labs, but how do we blend that with soft skills training? We need more conceptual and practical models for that, easy to implement and use.

More than 50 years ago, German universities were recommended to complete at least 20% of soft skills training (Ihsen, 2003). Today, soft skills are discussed more than ever. The reason is usually that employers today want flexible employees who can grow in the company and its constant change and at the same time make the employee successful with their work. A person with excellent technical skills (hard skills) but lacking soft skills will have a more challenging time succeeding in their workplace. Therefore, the demand for social and emotional skills will increase by 30% and a significant restructuring of today's education is needed to achieve this increased demand. It is estimated that 80% of existing staff in companies also need skills development in soft skills (Heckman, 2012).

Soft skills are often considered more complex to train than hard ones. Defining soft skills is not very easy because soft skills differ from context to context. Soft skills often complement the hard skills, but to name a few examples of soft skills and abilities are communication skills, structured and creative thinking, teamwork, adaptability, negotiation skills, scheduling skills, conflict management, initiative, analytical, cultural awareness, flexibility awareness, empathy, work ethic, project management, self-esteem and active listening. (Heckman, 2012).

This complexity of skills requires new pedagogical tools and approaches. The question is how we can design new education approaches where the soft skills are integrated and trained in a structured way.
In the paradigm shift that is currently taking place, the role of future industrial workers will be a new and more multifaceted profession. The industrial worker will not disappear, but their role will be decisive from entirely new perspectives. The soft skills are important factors for the company / business to offer a good working environment, and to have good relationships and motivated employees. Workers could feel that they are part of a larger context, which leads to increased efficiency, development and profitability in the company and its operations (Lindmark and Önnevik, 2011).

Join us for this important discussion where your experience and ideas meet our urgent reality case!

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Course H[OER]oes? Ethical Data Collection in Open Digital Societies

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Elevator Pitch

In 2021 networked learning community scholars responded to a call inviting discussion of how they made meaning of the term networked learning and understood its associated practices (Gourlay et al., 2021). The insights shared and questions raised have implications for all educators and scholars working with and among students of all levels. The purpose of this roundtable discussion will be to consider the relevance of these insights and questions for those whose work centers open educational resources and collection of data related to their use. In particular, participants will discuss whether and how to gather, analyse and store data in ways which honour the "trusting relationships" (Gourlay et al., 2021, p. 337) considered essential to "socially just" (Bali, 2020, n.p.) networked learning experiences. Discussants will be invited to unravel to what extent the use, modification, or creation of open educational resources qualify as networked learning, explore the impact the use of related technology has on pedagogy, and work together to explicate whom, in fact, such practices and connections are ultimately for (Gourlay et al., 2021). The authors of this paper will share research and experiences related to the development of a student data privacy framework intended to guide data collection practices for materials created in association with the academic library's open educational resource publishing program.

Open educational resources (OER) are "teaching, learning and research materials that make use of appropriate tools, such as open licensing, to permit their free reuse, continuous improvement and repurposing by others for educational purposes" (Miao et al., 2019, p. 9). Academic libraries are becoming increasingly involved in the creation, modification, publication and distribution of OER. This involvement has come about in large part because of existing infrastructures and skill sets present in libraries, but also because of the perceived compatibility of libraries' mission and the potential OER are seen as having for catalysing change in higher education (Gong, 2021). As a result of this increased involvement in the OER creation and publication life cycle, librarians are finding themselves adding OER project management to their already full plates, wrestling with decisions such as whether and how to ethically gather, analyse, and store data generated by their use.

The gathering, analysis, and storing of student data is a common practice across higher educational institutions. Used properly, data can benefit students and institutions alike. One specific form of student data is learning analytics (LA). LA is data about learners and their learning environments that can be used to understand and optimize their learning experiences (International Learning Analytics &Knowledge Conference, 2010). This data includes data produced by students while in the learning environment as well as outside feedback or information that is provided about learners and the learning environment.

Although guidance has bene published regarding technical, procedural and governing aspects of student data management, best practices have rarely been codified. Despite educational laws such as FERPA, the prevalence of leeway, loopholes, and lack of required data practices put students' data privacy, and consequently their wellbeing, at risk (Zeide, 2016; 2017). Additionally, privacy scholars warn of the ethical conundrums that come along with any student data use, such as encroachments upon student autonomy and intellectual freedom.

It is generally accepted that at least some learning analytics are necessary to inform continuous improved effectiveness of instructional practices over time and ensuring that the instruction or learning object is achieving its objectives (Liu et al., 2021). While some find it sufficient to set a broad standard of collecting data to advance university or library goals, scholars have argued that this expansive reasoning could lead to overreach and dangerous situations for students. Privacy is an issue that has been codified into library codes of practice. Four of the nine principles listed in the American Library Association's 'Code of Ethics' (2021) echo a duty to privacy and respect for intellectual property and safety (principle nos. 2, 3, 4, 5, and 6). The National Information Standards Organization (NISO, 2015) published its 'Consensus Principles on Users' Digital Pracy in Library, Publisher, and Software-Provider Systems' as a "starting point" (p. 5) for library practitioners in protecting user privacy. Given these vocational imperatives, libraries have a duty to do more to protect users' privacy and rights than what is limitedly required by law. Libraries are uniquely situated within academia and hold the potential to affect institutional student data practices among institutional partners and stakeholders (Oakleaf, 2018).

Goals

Participants in this round table discussion will consider questions about the ethical use of student data such as what options lead to the most positive consequences, what benefits/harms/alternatives might be embedded in these options, which options respect students' rights, ensure equity, and advance the common good? The authors will, as needed, introduce into conversation feedback received during presentations in which they described the development of their department's student privacy framework. It is hoped that outcomes of this roundtable discussion will include articulation of whether/how data collection frameworks can inform ethical practices in networked learning experiences involving OER.

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The paradox of designing networked learning throughout the employee life cycle

Simon Skårhøj

Elevator pitch

How can organisations cultivate professional and social networks which accelerate knowledge sharing throughout the employee life cycle? The increasing complexity of the workplace environment and continuously changing processes makes it relevant for many organisations to invest in their social network structures, communities, and knowledge sharing. However, ultimately these social and relational processes are depended on the employees' personalities, interests, ownership, and motivation and which do not necessarily correspond with the organisation's strategy, priorities, timing, and resources. This constitutes a paradox between the strategic priority for networked learning and the employees' interest and motivation to participate in knowledge sharing. Both elements are true, interconnected and mutually exclusive elements and raise a paradox (Lüscher, 2019:8) for networked learning designers in organisations between intended design and uncertain evolution.

In this round table we shall explore the opportunities and limitations of designing networked learning throughout the employee life cycle in organisations:

- How can organisations cultivate professional and social networks that accelerate knowledge sharing throughout the employee's life cycle?
- If there is a paradox between organisational design for networked learning and the individual evolution of interactions and learning among employees, how can we understand it?
- How and when do social network and relations in a workplace environment lead to (applied) learning – or limit it?
- What are the potentials to assess and measure learning in social networks in organisations?
- How can we further conceptualise networked learning in a workplace environment?

Background

The workplace is a unique learning environment with its conditions for learning. It is a place and space for networked learning with interactions between people and resources (Goodyear et al, 2004, p.1) and today often mediated by ICT. Workplace learning takes place in a dynamic relation between employee learning potentials and the production and community elements of the workplace environment (Illeris, 2011:30). All three elements; the employee, organisational/production environment and the community/culture are critical to consider when suggesting supporting designs for networked learning in organisations.

Professional connections in the workplace are often critical and a prerequisite for navigating organisational processes effectively and performing the required work assignments. The relevance, quality and development of connections vary throughout the employee's life cycle in the organisation. From onboarding to offboarding. The connections are important due to their informational benefits. This includes information related to (Waldstrøm2007:155):

1) solutions to e.g. a specific problem,
2) meta-knowledge which makes it possible to find the knowledge needed to solve the problem (e.g. who to ask),
3) problem reformulation to focus a problem or understand it better,
4) validation of the direction to solve a problem (e.g. consulting an expert) and
5) legitimation, e.g. a blueprint from an expert on an approach to solving a problem.

Compared to many other organisational elements, established connections have the potential to be consulted when the employee transition into a new organisation or workplace.

Similar to personal relations the interaction with organisational resources is relevant to consider. Codified organisational information in policies, documents on intranets etc. are only influencing practice if the employees interact with it; first, by being read; second, by being interpreted; and third, by being practised.

The "employee life cycle of connections" in an organisation is evolving from onboarding to offboarding. Wenger's (1998:154) five trajectories for communities can contribute to conceptualizing the life cycle of connections in organisations. *Inbound trajectories* where the new employees are entering the organisation and are invested in developing connections to other employees. The *insider trajectories* where the employee has established connections, but the evolution of connections continues. From an organisation point of view, the potential trajectories are many and can be limited and encouraged organisationally. Some connections will only need to be peripheral and may be developed over time. The organisation can support the employee in selecting the most relevant trajectories related to their work assignments but cannot force learning to take place. Boundary trajectories are connections across communities in the workplace or to other organisations. Lastly, the outbound trajectories end the life cycle which leads the employee out of the community, connections, and organisation.

Networked learning framed as social learning, communities of practice or network learning is increasingly explored in organisations as a response to lifelong learning and adaptation to constantly changing internal and external environments.

Goal

The goal of the round table is to further conceptualise networked learning in the workplace throughout the employee life cycle and within and across organisational boundaries. In addition, explore the design challenges for strategically cultivating organisational design which supports networked learning.

How to engage the participants into the discussion

The round table will be kicked off with 3 pitches related to networked and social learning in the workplace:

- Pitch one will focus on conceptual designs for networked learning throughout the employee life cycle
- Pitch two will take a practical perspective with practitioner voices from a workplace (video)
- Pitch three will focus on assessing and measuring the value of network and sharing

After the three pitches, the participants will go into an individual reflection process followed by sharing in pairs with a focus on their considerations and experiences in relation to the topic.

Following the reflection process, the discussion will continue into a plenum discussion with participants and the host. The session will end with summing up the key findings and potential areas to explore further.

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Host background

Simon Skårhøj holds a master in Global Studies and Psychology from Roskilde University with specialisation in leading organisational learning including innovation, community, and participation. Practical experience from establishing and leading a Learning Lab in a larger Danish NGO with a focus on both analogue and digital learning, advancing the learning ecosystem among UNICEFs regions and established a learning collaboration and community among 30 NGOs and an extended network of 1.000 NGOs globally, Currently Capacity Development Advisor at Danida Fellowship Centre and independent consultant and researcher.

WORKSHOPS

Thinking through ACAD - learning to see theory in action

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General information

The Activity-Centred Analysis and Design (ACAD) has been developed as a meta-theoretical framework for understanding and improving complex networked learning situations (Goodyear et al., 2021; Goodyear & Carvalho, 2014). ACAD helps to foreground two distinct moments related to the design of complex learning situations. The first entails advanced planning – and it involves design time – when an educator may consider the selection of specific tasks, tools, and complementary social arrangements of a learning situation. The second involves learning time – or what happens as a learning activity unfolds.

When designing for networked learning educators need to anticipate a certain form of human activity and consider how designable elements may influence what students do (first view). But educators also need to channel what actually happens on the day, as activity unfolds, noticing how designable elements influence (or not) the intended learning activity (second view). One difficulty for teachers or educational designers relates to being able to draw connections between what has been designed (planned) and what learners actually do (learn).

Our work has been applying ideas from the Activity-Centred Analysis and Design (ACAD) framework and wireframe (Goodyear et al., 2021; Goodyear & Carvalho, 2014; Yeoman & Carvalho, 2018) to the analysis of learning situations. Our workshops are designed to initiate and enrich discussions about educational concepts among groups of educators with or without previous pedagogical training (Yeoman & Carvalho, 2018). These discussions support educators to make the subtle but crucial distinction between what is open to alteration through design and what is not. For example, educators may be able to control a number of task parameters such as pace, timing, assessment and mode of instruction, but not how long it takes for each student to grasp a concept or what they already know. In learning to make this crucial distinction, educators often begin to see a broader range of actionable pedagogical possibilities.

ACAD allows us to focus on how three dimensions of design (within our control) influence a fourth, which is emergent learning activity (not within our control). The dimensions of ACAD include:

- set design - the physical/digital tools available to learners,
- epistemic design - the assigned tasks or suggestions of useful things to do,
- social design - the specific social arrangements used such as groups, pairs etc. and,
- co-creation and co-configuration activity - the emergent learning activity on the day that is not designable.

ACAD has been used in the analysis and design of a broad range of complex learning situations in universities, schools, museums, and informal settings. In recent years ACAD has been translated into Spanish (Goodyear et al, 2021) and an online application, which will be presented in this workshop (Figure 1).

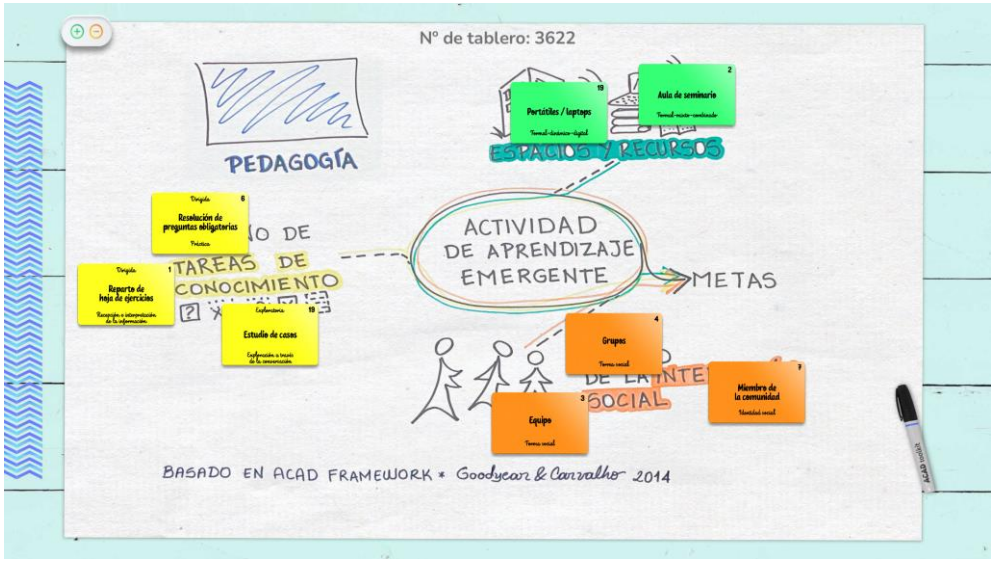

Figure 1: ACAD Toolkit App (Spanish version)

Intended Audience

Educational Researchers, Educators and Learning Designers interested in design for networked learning

Workshop Description

This workshop will invite participants to reflect on ways of engaging in innovative educational design across formal and informal networked learning environments, that is, applicants will reflect on how pedagogical, digital/material resources, and people may be brought together when designing for networked learning, whilst practically applying ACAD concepts. The workshop aims to introduce participants to ways of connecting theory, design, and practice and practically experience the English version of the ACAD app (online version of the ACAD cards and wireframe) in the analysis of selected case studies. Participants will consider how to ensure that design choices are coherent across scale levels and how to accommodate socio-cultural and socio-material approaches to learning. They will also reflect on how to support autonomy and collaboration, diversity and choice through networked learning.

The workshop will be co-hosted in a hybrid session that will accommodate online and face-to-face participants. Participants will also have an opportunity to use the ACAD toolkit app. The workshop will include a 15-minute presentation to introduce participants to core ideas of the ACAD framework and wireframe. Participants will also have a short demo of the ACAD app. Participants will then work in groups to analyse a case study and to jointly discuss a specific design challenge.

Participant Engagement

Using breakout rooms in Zoom and within the physical space at the conference venue, participants will be placed into groups to become familiar with the tools and discuss their analysis of a case and suggest design for networked learning possibilities, using workshop materials (Table 1).

	Objective	Design task
Task 0	Introduction: participants become familiar with the ACAD dimensions by manipulating the cards and wireframe.	Focus: exploring the range of terms on the ACAD cards with respect to familiarity, relevance, fit within context etc., to surface individual values and beliefs about learning.
Task 1	Connect theory and practice: participants learn how to use the cards with the help of the ACAD wireframe.	Focus: creating shared consensus about learning theory, clearly articulating that theory, and tracing correspondence or dissonance across dimensions of design and scale levels.
Task 2	Bring theory into practice: participants work on a design challenge.	Focus: identifying elements of each dimension that are open to design and within their sphere of control and shaping them in ways that increase the coherence of the whole.
Task 3	Reflection: participants reflect on the process and consider future alternative applications.	Focus: proposing other contexts in which these concepts (ACAD) and tools (Toolkit) may be useful for designing or analysing learning activity.

Table 1: Objective and Design tasks

Task 1

The first task will involve the selection and analysis of a learning situation as presented in a short case study.

Task 2

The second task will build on Task 1 and involves a related design challenge. Participants will be encouraged to change an aspect of the original case study, proposing an innovation in response to a challenge. For example, a change in mode from f2f to online, a change in access from clinic visits to Zoom consults etc.).

Task 3

The third task will involve a structured reflection in which participants will consider how the ACAD Toolkit could be applied in their contexts, contributing to the development of new ways of applying ACAD in networked learning settings.

Participant Outcomes

Participants will have an opportunity to become familiar with key ACAD concepts and apply them in conversation with peers—connecting theory, design and practice.

Workshop Alignment with the Conference Themes

This workshop aligns with the theme of 'Philosophies, Theories, Methodologies and Designs for Networked Learning'.

In addition, most of the short (max 500 word) case studies are based on work previously published in networked learning-related outputs, for example:

> Case Study 1 – CmyView (Carvalho & Garduño Freeman, 2018)
> University students of Architecture use a mobile app and the surrounding physical environment to identify and share places of interest, learning about the nuances of design in the built environment. This case highlights the richness of asynchronous place-based networked learning.
>
> Case Study 2 – Edward & Isobel (Yeoman, 2018)

School students, work independently to solve a prescribed task and a number of physical and digital challenges arising in their efforts to calculate the height of their jumps both in class and on the moon. This case highlights co-configuration and co-construction in a large (180 students and seven teachers) open plan networked learning environment.

Case Study 3 – Fast Food da Politica (Carvalho, Yeoman, & Carvalho, 2021)
Citizens are invited to engage in political debate as they participate in life sized adaptations of familiar board games in public spaces. This case illustrates how physical and online spaces come together to encourage, support and showcase a strategic vision. As a not-for-profit organisation, Fast Food da Politica (FFDP) relies on social media and crowdfunding and makes its learning resources freely available to those in any community interested in building on these ideas.

Workshop Process/Activities

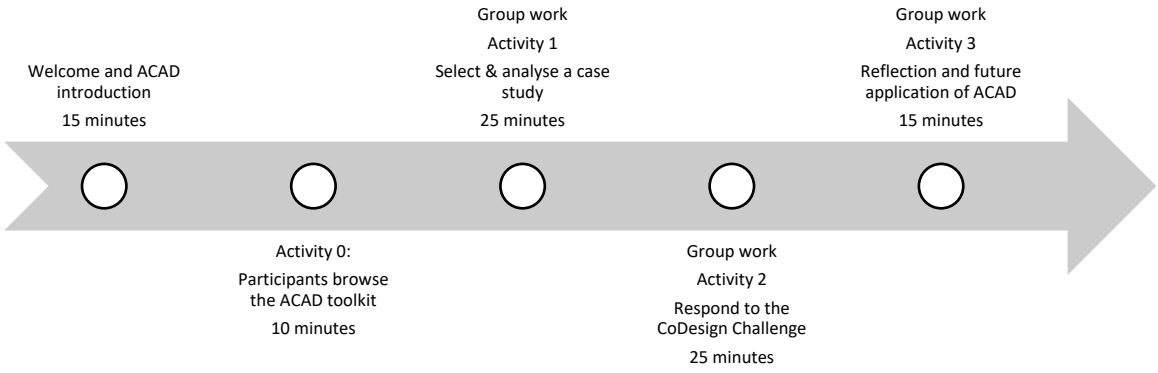

Figure 2: NLC ACAD Workshop Process

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Designing for Networked Learning in 360VR - A scenographic turn in online learning environments?

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Workshop Description

Despite the growing popularity of Virtual Reality (VR) in Higher Education (HE), there is a lack of studies dealing with networked and collaborative activities in VR (Radianti et al., 2020). Historically, VR has been promoted as an educational technology that can give access to exotic places or dangerous situations through computer-generated virtual worlds. Another area of application of VR has been therapeutical sessions exposing individuals to unknown situations. Concepts like interactivity, immersion and presence has been shaping the discourse of educational VR (Markowitz & Bailenson, 2019), but that is not necessarily supporting a networked or collaborative learning approach. Recently, 360-degree video cameras has made it possible to record situated practices, which can then be used as the canvas in the virtual world (McIlvenny & Davidsen, 2017). Pirker et al. (2021) argued that 360VR could potentially be a game-changer for distant education, but it is also clear that 360VR pose a new medium for supporting Networked Learning. Basically, 360VR presents a transition from logocentric platforms (e.g. Moodle) emphasising the exchange of text between peers towards platforms that build upon ideas of immersion, inhabitation and multimodality. The aim of the workshop is to discuss how principles of Networked Learning can inform the design of 360VR activities in HE.

CAVA360VR is a prototype Unity-based Windows application supporting 20 simultaneous participants to collaboratively analyse, visualise and annotate 360° video in VR. CAVA360VR is developed by the BigSoftVideo team (www.bigvideo.aau.dk) in Aalborg University (McIlvenny, 2020). In CAVA360VR, remote participants can share, view and interact with a 360° video together, draw on the 360° video, use a 'mirror-cam' to see what is behind you, use a laser pointer to guide others' attention, import a 2D image, view a transcript, and view a synced 2D video with the 360° video. Further, participants can talk to each other, and the audio is spatialized in the VR environment. In CAVA360VR, each participant is represented with an avatar that follows the orientation of the Head Mounted Display (HMD) of the individual participant and the controllers are showed as pair of avatar hands. The potential of CAVA360VR is also particularly interesting in the context of Networked Learning as it offers a new platform for designing for learning. CAVA360VR is not only available in VR, but can also run as a standard desktop application, which allows a larger, mixed group to participate in the analysis of the recorded data. Not all of the features available in VR are available in non-VR mode. For two years, CAVA360VR has been used in many video data sessions (Jordan & Henderson, 1995; McIlvenny, 2020) with participants – for example, from Ghana, Finland and Denmark – analysing 360° video data together. The potential of CAVA360VR is also particularly interesting in the context of Networked Learning as it offers a new platform for designing for learning. This includes addressing how to collect 360 video data, how to pedagogically design activities, and how to support students negotiating of meaning in 360VR, etc.

In the workshop we will share examples from a series of recent pilot experiments where medical students collaborate in 360VR. In these experiments students from the 5th semester medical programme in Aalborg University were collaboratively working with a 17-minute-long non-scripted 360° video showing a professor and two students examining the collateral ligaments of a knee. The 17 minutes is from a longer session lasting almost 100 minutes, but we decided to focus on this part to limit the time in 360°VR. In the video, one of the students is performing a physical examination of the knee collateral ligaments of the other student's knee and the professor is providing feedback and stimulating questions during their examination. In the original video it is clear that the students are making some errors as this is their first time examining the knee collateral ligaments, providing the basis for a type of failure-based learning activity (Kapur, 2015).

In image above, you see five students participating in one of the experiments. For each of the 3 experiments, the students were given a headset and a pair of controllers. Each of them was in separate rooms in the university building but could have participated from their home or a completely different place. The basic question we want to address with the participants in the workshop is how can principles of networked learning inform the design of 360VR applications and activities?

Intended Audience

The workshop is relevant for all researchers and practitioners interested in discussing how principles of Networked Learning can inform the design and evaluation of collaborative activities in 360VR. No prior experience with VR-based activities is needed for participating in this workshop.

Participant Engagement

Participants are invited to discuss how principles of Networked Learning can be used to design 360VR learning activities. During the workshop we will do a live demonstration of software designed to support up to 20 simultaneous users in Immersive Virtual Reality called CAVA360VR. We will bring a Virtual Reality Headset to the workshop to allow the participants to try networked 360VR.

Participant Outcomes

Participants will get a first hand experience using a software prototype called CAVA360VR (McIlvenny, 2020) developed by the BigSoftVideo group in Aalborg University, Denmark. In addition, we will share data (for the participants to analyse) from a collaborative 360VR activity in medicine education.

Workshop Alignment with Conference Themes

The workshop is first of all presenting a new type of learning environment in the context of Networked Learning. In addition, we invite the Networked Learning community to act as co-designers of 360VR activities.

Workshop Process/Activities.

1. A brief introduction to 360VR research - what themes are currently emerging in the area of networked and distant learning using 360VR - 10 minutes
2. An introduction to and demonstration of CAVA360VR - this part will feature a live activity with networked participants. - 10 minutes

3. Participant will analyse video from our pilot experiment in a rapid data session (30 minutes)
4. A brainstorming session on how principles of Networked Learning can inform the design 360VR Learning Designs (This discussion will be captured and achieved using post-it notes/poster) - 30 minutes
5. Wrap up in plenum (10 minutes)

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Phenomenology of Practice

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Intended Audience

Delegates interested in exploring phenomenology and applying it to networked learning. Hanfod.NL organised a phenomenology of practice 'node' event in 2021, sponsored by the Networked Learning Conference Consortium. This event, due to be held in Cardiff, UK, had to pivot online due to the pandemic and attracted pleasing levels of interest. We would like to take the opportunity to run the workshop in-person at the conference while people are together, building on the momentum from 2021 and projecting it into the future with hopes of enlisting more collaborators, possibly for a Networked Learning and Phenomenology edited book in the Springer NL series, but certainly for opening up avenues of related work being presented at future Networked Learning conferences.

Workshop Description

Cathy Adams introduced the 2021 workshop on YouTube https://youtu.be/WTMUhULWyh4
In this video she explains something of the breadth of PoP's applications to research our students or colleagues everyday lived experiences. The workshop's method relies heavily on ideas from phenomenology's originary contributors but the emphasis is not on philosophy, rather learning by doing phenomenology. The workshop begins with a didactic session to cover some of the core phenomenological understandings, taking in questions such as, 'what exactly is lived experience?', 'why pre-reflective?', 'how does phenomenology go about studying the pre-reflective?', 'what is the reduction?', 'what is meant by "wonder in the face of the world"?'. We will explore what a phenomenological research question looks like.

Participant Engagement

The workshop is essentially discursive and dialogical. Participants will be invited to compose phenomenological research questions, considering their viability and scope, under guidance from the facilitators. The workshop proceeds by participants writing lived experience descriptions and developing preliminary theme statements from these accounts, through line-by-line reflection and existential analysis. We will explore the epoché / reduction couplet and how these contribute and unfold in a research project. We will take these ideas and elaborate how they were applied in a recent paper we have written, inviting participants to join us in developing their own publishable contribution to networked learning and phenomenology.

Participant Outcomes

Participants will have been introduced to the core ideas from phenomenology of practice approach.
Participants will have started out on developing their own ideas for publishable research using phenomenology of practice.
Participants will have networked with members of hanfod.NL which seeds the opportunity for further collaboration amongst us.

Workshop Alignment with Conference Themes

The workshop aligns with conference themes such as:

- Philosophies, theories, methodologies and designs for Networked Learning

- Methods, research design, data and analysis in Networked Learning

Participants can apply phenomenology of practice in any number of ways, including but not limited to other themes:

- Conceptualisations of networked lifelong learning as a blended, boundless or hybrid phenomenon
- Learning on the move: places and spaces for networked learning
- Networked learning across the lifespan (early childhood, school, work and retirement)
- Ethical perspectives on Networked Learning (e.g., equity, inclusivity, social justice, values)
- Debates and emerging issues in Networked Learning (e.g., the future of lifelong learning, hybridity, post-digital education, sustainability)

Workshop Process/Activities

We hope to follow the same format as was planned for the Cardiff Event in June 2021. We would like to spread the workshop over 2 days, with 90 minutes each day (total 3 hours plus a break). We prefer an overnight break to allow participants to ruminate. If this amount of time is not possible, we could take the second session online later in the conference week.

Session 1 - 90 minutes
Introduction to phenomenological research and basic concepts
EXERCISE: crafting a phenomenological research question

Session 2 - 90 minutes
Doing phenomenological research: human science (e.g. gathering material through interviewing, observation) and philosophical methods (e.g., the reduction)
EXERCISE: writing lived experience descriptions

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BRIDGES - designing a European Digital Education Hub (EDEH) to support networked digital learning as we transition from Emergency Remote Teaching (ERT) to effective post-digital education.

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Structure of a workshop proposal

Intended Audience

HE educators and staff from institutions across the EU and associated countries

Introduction

The COVID-19 pandemic has accelerated the need for effective digital education across all education sectors, but perhaps especially within the HE context. Initially in 2020 the rush to continue to deliver teaching and learning to students who were no longer allowed on campus was characterised by a process of trying to emulate online what had previously been occurring offline. This included activities such as large and unwieldy online lectures and classes, often featuring the same powerpoint presentations as would be used in a face-to-face setting, and a general failure to adapt materials and pedagogies to take full advantage of the affordances presented by the digital context. This period has been coined Emergency Remote Teaching (ERT). During 2021 more co-ordinated and highly developed approaches have been explored by HE Institutions as it became clear that COVID-19 was not going away and that the long-term reality of HE teaching and learning lay in new approaches (e.g. blended learning) and new pedagogies (e.g. networked learning). This led to the rise of the post-digital education paradigm. However, across many institutions, regions and countries there remains a lack of support, resources and training for HE educators in post-digital education. The BRIDGES Erasmus+ project aims to work with European educators and learn from existing research in these areas to better understand these shortfalls and develop a digital platform - the European Digital Education Hub - to help address the gaps.

Workshop Description

The context of the workshop is as part of an Erasmus+ project: BRIDGES, which is funded under the Erasmus+ extraordinary call to support Digital Education. The aim of the workshop is to work with expert conference attendees to identify the user requirements for a European Digital Education Hub (EDEH) to support effective networked digital learning. The EDEH will feature bespoke MOOCs (in multiple languages), digital tools, tutorials, Open Education Resource repositories and community support discussion spaces.
The project team would like to learn from the expert conference attendees what they would most like to see in each of these categories, what would best support them (and non-experts) in delivering networked digital learning, and what EDEH usability features would be most useful. This information will directly contribute to shaping the development of the EDEH.

Workshop Alignment with Conference Themes

This workshop will directly contribute to the development of a platform (the EDEH) to help support HE educators wishing to implement networked digital learning and post-digital education. In this way, it aligns with the themes of:

- sustainability in networked learning (long-term support for educators)
- debates in networked learning (post-digital education: how to support non-expert staff now that ERT has accelerated digital education into the mainstream)
- inclusivity and accessibility in networked learning (user-driven design and multiple language support)

Workshop Process/Activities

1. The BRIDGES team will first, briefly, present the research findings of the project concerning the experience of HE educators with ERT before, during and after the COVID-19 lockdown periods and the development of a Framework for Networked Learning for the support of educators in the transition to post-digital education. This mixed methods data was collected from 25 1-to-1 semi-formal interviews (thematic analysis) and ~200 quantitative survey responses (statistical analysis). [5 minutes]

2. The BRIDGES team will, very briefly, explain the intent, aims and planned functionalities of theEDEH [5 minutes]

3. Vevox.app polling system set-up (see below- Engagement) [5 minutes]

4. Groupwork: Participant views and preferences for the EDH will be collected (see below - Engagement) [70 minutes]

5. Session summary and close [5 minutes]

Participant engagement

- Participants attending in-person will self-organise into small groups of 3-4 (only restriction being that no-one from the same institution can be in the same group), those attending virtually will work as a single group (unless numbers are prohibitive, in which case break-out rooms will be used (software permitting))

- Groups will be presented with a series of specific tasks/questions related to the individual features planned for the EDEH (MOOC content; digital tool preferences; tutorial topics; OER repositories; community support discussion spaces).

- Groups will be given up to 7 minutes to discuss before expressing their preferences and requirements. This will be done via online poll-style multiple-choice questions using Vevox (for both in-person and virtual groups).

- Poll results will be immediately displayed by the BRIDGES team and will be used to stimulate whole workshop discussions after each task, lasting up to 7 minutes. One of the three workshop conveners will be specifically tasked with monitoring the inputs coming from virtual attendees and relaying them to the in-person attendees where necessary [NOTE: these discussions will be recorded].

- Participants who are interested in continuing to help develop the EDEH (via a 'living labs' methodology) will be invited to register their details (online) and will thereby gain access to future prototype versions of the EDEH for testing and feedback once the platform has been sufficiently developed.

Participant Outcomes

Participants will have directly contributed to the design and development of the European Digital Education Hub for networked digital learning. They will have learnt about the experiences of HE educators delivering ERT and digital teaching and learning across the EU and Associated Nations before, during and after the pandemic period and will be able to compare their own experiences with those of others. They will also have been introduced to the

Framework for Networked Learning in support of HE educators transitioning to post-digital education. It also offers the opportunity to become an early member of our 'living lab' community for the development of the EDEH, providing access to the prototype EDEH and the chance to influence development on an on-going basis long after the end of the workshop.

Students' Basic Psychological Needs in Blended Teacher Learning Groups During COVID-19

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Intended Audience

This workshop has three target groups: educational researchers, educational professionals (teacher trainers), and students (student teachers).

Workshop Description

Teacher Learning Groups (TLGs) are social configurations in which student teachers (henceforth: students) learn together with peers, teacher trainers and teachers through social interactions (Doppenberg et al., 2012). Due to the restrictions caused by the COVID-19 pandemic, blended education has developed quickly. Blended education combines contact learning with distance learning ((Müller & Mildenberger, 2021). This workshop aims to shed light on how blended meetings interfere with the fulfilment of students' basic psychological needs in TLGs. We also want to find out how to facilitate TLGs to support students' basic psychological needs in times when social distancing is necessary or when blended education is convenient (e.g., to enhance the accessibility of education). The likelihood of study success increases when students are motivated for their studies (Howard et al., 2021). Study motivation is enhanced by learning environments that support students' basic psychological needs (i.e., autonomy, relatedness, and competence) (Ryan & Deci, 2020). These needs can be met in TLGs as learning in TLGs is brought about by an autonomous, intrinsic learning need, where the direct applicability of the acquired knowledge increases students' competence in relation to others (Vrieling-Teunter, de Vries, et al., 2021).

However, important preconditions to fulfil students' basic psychological needs are related to the TLGs social configuration (i.e., social patterns of group constellation, behaviour, and thinking). The social configurations of TLGs can be mapped to three dimensions (i.e., practice integration, long term orientation and goals, and shared identity and equal relationships) (Vrieling-Teunter, Hebing, et al., 2021). Earlier research shows, for example, that working equally in an informal atmosphere – as described in the dimension of shared identity and equal relationships – is positively related to students' basic psychological needs (Vrieling-Teunter, de Vries, et al., 2021).

It was common for TLGs to convene physically on a regular basis. However, this has abruptly changed due to COVID-19. Because of the COVID-19 measures imposed by the Dutch government (e.g., strict isolation measures), TLGs had to switch constantly between contact learning and distance learning, often at the last moment, and went (partially) online for their meetings. The expected change this has constituted in the social configurations of TLGs, may put the preconditions to meet the fulfilment of students' basic psychological needs under pressure.

This expectation is in line with students' perception of reduced fulfilment of their basic psychological needs in general within educational institutes in the Netherlands and other Western countries during COVID-19 (e.g., Vermote et al., 2020). In this workshop we present the results of an exploratory study on how students perceive the social configurations and basic psychological needs in TLGs during COVID-19.

We examined the relationship between social configurations and basic psychological needs of students in TLGs through a convergent parallel mixed-methods pre- and post-test design (Creswell, 2014). The students (n = 91) participated in TLGs for one academic year organized within four different primary teacher training institutes in the Netherlands. Data was gathered at the start (October/November 2020) and at the end (May/June 2021) of the academic year. Since the four teacher training institutes were facilitated differently in their TLG key elements (i.e. composition, goals, frequency, duration, guidance, and assessment of the meetings), we had the opportunity to investigate: (a) in which ways students experienced a variety in social configurations of TLGs during COVID-19 and (b) the extent to which TLGs' social configurations were related to students' basic psychological needs. The variables social configuration and basic psychological needs were assessed qualitatively through the use of interviews and quantitatively employing two online surveys: the 'Dimensions of Social Learning Questionnaire' (Vrieling-Teunter et al., 2020) and the 'Basic Psychological Need Satisfaction and Frustration Scale' (BPNSFS; Chen et al., 2015). The latter we will explain in more detail during the workshop.

In semi-structured interviews, 14 students from across the four institutes reflected on their perceived social configurations and basic psychological needs in TLGs at the time of COVID-19. This reflection showed that blended TLG meetings can be made worthwhile for students, but students also expressed the hurdles that are specific to working in TLGs when social distancing is necessary. For example, TLGs met the fulfilment of the need for **autonomy** as students experienced freedom of choice in how they could achieve their **goals** as part of the 'Long term orientation and goals' dimension. However, some students had to postpone or modify their goals because TLG activities were delayed or cancelled because of COVID-19 measures: *"Doing research in elementary schools ... was very difficult during the lockdown" (Institute C).* A second example is that TLGs met the fulfilment of the need for **relatedness** as students experienced **reciprocal relationships** as part of the 'Shared identity and equal relationships' dimension while working together with TLG members with various professional backgrounds during contact learning. Students pointed out that the presence of reciprocal relationships made them eager to learn together at times of COVID-19. However, students also noticed a formal atmosphere between TLG members when working together online during distance learning. While working online, students missed informal moments such as chatting or joking: *"There are fewer of those little moments to catch up on the weekend or other things" (Institute C).* A final example is that TLGs meet students' fulfilment of the need for **competence** during online TLG meetings, for example, by exchanging **practical experiences** in subgroups (e.g., Breakout Rooms) as part of the 'Practice integration' dimension. Students highlighted that this way of working made them feel capable to complete assignments for their education or internship. On the other hand, some students experienced too little time for exchanging practical experiences during online TLG meetings. The online meetings in (sub)groups were for instance organized only sporadically or very briefly or the students missed the exchange of practical experiences with the entire TLG group. *"It's actually more about the things they [students] encounter ... than what you would normally want to exchange. There's no room for that" (Institute D).*

Overall, the results of this exploratory study reveal the importance of facilitating relevant preconditions (e.g., providing time and space for informal moments during online TLG meetings) to enhance the fulfilment of students' basic psychological needs in TLGs at times when social distancing is necessary or when blended education is convenient. We believe this is a relevant topic for research and practice, seeing as blended learning will likely become the norm in higher education.

Participant Engagement

To involve participants during this workshop we will create a setting that allows workshop participants to experience first-hand what it is like to work together in a blended TLG. Workshop participants will participate simultaneously physically (onsite workshop participants) and online (offsite workshop participants). We will recreate an online meeting of a blended learning-themed TLG, centred around the phase of analysis and exploration – the first phase of Education Design Research (McKenney & Reeves, 2018) – which is the method used in most of the TLGs that were part of this study. Workshop participants will be assigned the role of student, and will be asked to engage in a Group Wisdom activity (i.e., mapping a digital group concept) to visualize which topics they value in order to arrive at a common focus for the recreated TLG. To secure enough participants in both modes, particularly online we will engage student teachers from our institutions to participate in this workshop. We will

share what our research findings indicated concerning the difficulties students encountered while working blended on the analysis and exploration phase in the TLGs design process. Subsequently, we will challenge workshop participants to use Padlet for generating ideas on how feelings of autonomy, relatedness, and competence can be stimulated in a blended TLG. Supplementary to our recommendations, this may lead to additional recommendations for teacher training institutes to facilitate the social configuration of TLGs when organizing social learning (partially) online in order to meet the basic psychological needs of students.

Participant Outcomes

By participating in this workshop (pre-service) participants:

- will gain an understanding of the relationship between social configurations and basic psychological needs of students in TLGs during blended education, and
- will receive concrete recommendations for facilitating the social configuration of TLGs to support the basic psychological needs within educational formats when organizing social learning online.

Workshop Alignment with Conference Themes

This workshop addresses the theme of 'Debates and emerging issues in Networked Learning (e.g., the future of lifelong learning, hybridity, post-digital education, sustainability)', as it focuses on the emerging practice of networked learning in a blended educational setting. As working and learning in TLGs is conducive to motivation, and student motivation is one of the key issues in (partially) online education, blended learning in TLGs merits scholarly attention as well as awareness of practitioners.

Workshop Process/Activities

During the workshop, active online strategies will be used so that both onsite and online participants can cooperate:

1. Introduction: who is participating (digital pins on a map);
2. Prior knowledge of the participants concerning facilitating student motivation in TLGs (poll via Mentimeter);
3. Previous study: Student motivation in TLGs (Vrieling-Teunter, de Vries, et al., 2021): sharing and exploring guidelines for student facilitation (Padlet);
4. Blended learning-themed TLG: workshop participants work together in a blended recreated TLG (Group Wisdom activity);
5. Present study: Students' basic psychological needs in blended TLGs during COVID-19: sharing and exploring additional guidelines (Padlet);
6. Take-home message and networking session (open mic).

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