What's in a wiki?

Issues of agency in light of student teachers' encounters with wiki technology

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ABSTRACT

This paper reports from a collaborative creative writing project in teacher education that involved the use of wikis. A fortunate match between task and technology created much enthusiasm among student teachers, and – as evident from an analysis of their logs – a growing awareness of technology as something more than a tool neatly adapted to particular purposes. In interviews conducted at a later stage, this awareness is no longer evident, and the student teachers are unable to connect their experiences to concepts like 'digital competence' and 'learning outcomes'. The article discusses how and why teacher education should encourage a deeper understanding of technology, in which both human and technological agency are explored and problematized. This calls for a pedagogical setting that acknowledges the value of technological experimentation beyond recognized 'learning outcomes'.

Keywords

wikis, agency, digital competence, teacher education

INTRODUCTION

How do student student teachers perceive and understand technology? As controllable 'tools' that simply help to perform pre-defined tasks? As incomprehensible 'systems' beyond their influence and control (Nardi & O'Day, 2000)? Or as something in-between the two? Does it matter what student teachers understand about technologies as long as they can use them and implement them in their own teaching?

Agency is a term commonly connected to an individual's ability and power to act according to intent in order to bring about a desired result. In education, agency relates to the process of preparing pupils for independent adulthood and usually points to actively taking control of one's life instead of merely reacting to or repeating given practices (Lipponen & Kumpulainen, 2009). Can this view of agency be transferred to student teachers'

Idunn
Nordiske tidsskrifter på nett

dealings with technology? In order to assess to what extent future teachers are indeed able to 'actively take control of their lives' and 'bring about desired results' in technology-rich settings, it seems important to look beyond merely observable traits like usage patterns or computer skills. While student teachers' attitudes to technology have been investigated (Teo *et al.*, 2007), little attention has so far been given to how student teachers conceive their possibilities for action and change in relation to the digital applications they are required to apply in their future practices. There are few studies related to how agency connects to student teachers' *perceptions* of technology, or to how this connection should be dealt with in teacher education.

In the last decade, much effort has been put into defining the specific demands on new teachers' digital skills and to how they should be strengthened in their training (Røkenes & Krumsvik, 2014). A strong current in much of this work is – as with studies on technology in higher education in general – to find correlations between technology use and learning outcomes and how technologies can *enhance learning* (Kirkwood & Price, 2014; Selwyn, 2010). The present paper has a different concern: how student teachers perceive the human-technology relationship and how their perceptions are shaped by their experiences with technology inside their formal training. The findings of the present article point to the relevance of looking beyond the metaphorical tools-system scale that tends to posit technology as either a tool for human purposes or an omnipotent 'system' determining human conduct. Rather, in the light of the data here, humans and technology become conceivable as intertwined and co-constituting one another. In this, technologies serve as more than convenient tools; they act and make a difference. The often-implied preeminence of a particular human form of agency can be questioned, allowing us to rather think in terms of a kind of networked agency. At a theoretical level, this outcome brings the present inquiry in dialogue with recent strains in new materialism (Coole & Frost, 2010; Pötzsch, 2017) and with actor-network theory (Latour, 2007).

The argument builds on experiences from a project in which third year student teachers were introduced to wikis. In this project, the wiki was to be tried out as a means to reach aims related to genre texts, collaborative writing and digital publishing in the subject Norwegian, as part of larger study on use of digital tools in teacher education. In the larger study, the primary data would depend on the interviews, but the students' logs – in which they had been asked to record their writing – were also collected. The logs turned out to yield unexpected and interesting findings. In addition to accounting for their activities, the students used the logs to express their views about the technology. They gave lengthy elaborations about what they had observed about the wiki and what they thought of it; they suggested alternatives and outlined imagined uses of wikis in their future teaching careers. When the same students were interviewed later they were much less eager to talk about technology, and were largely unable to connect their wiki experiences to the researcher's questions about digital competence and learning value.

What caused the students to talk about technology with such keenness in their logs? Why did the interviews fail to capture this interest? Based on the data material, the author proposes that the combination of task and technology in the project turned out to be particularly favourable, and provided an opportunity for the students to discover the relationship between the technology's affordances and their own capacities, enabling an implicit

Idunn
Nordiske tidsskrifter på nett

problematization of agency. The fact that the students were unable to translate these experiences into explicit notions of 'learning outcome' and 'digital competence' is, arguably, due to a human-centred tools metaphor that underlies much of contemporary thinking on the relation between teaching, learning, and technology.

The place of technology in teacher education

Since the Norwegian National Curriculum in 2006 called upon educators to label digital skills a *basic skill*, questions about digital technology have been extremely important at all levels of the educational system. As far as teacher education is concerned, several reports have concluded that there is a 'slow uptake' of technologies and still a way to go before student teachers' digital competence reaches the desired level (Tømte, Kårstein, & Olsen, 2013; Gudmundsdottir, Loftsgarden, & Ottestad, 2014). Reasons have been identified as both human, technological and institutional: lack of competent role models, lack of coherent management support, poor integration of technology in curriculum documents, or even too much variation between institutions, to name a few (Instefjord & Munthe, 2014).

While these studies are interesting and relevant, they implicitly reiterate a tools-based understanding of technology and an assumption that the use of technologies in education is both necessary and beneficial. A decade ago, policy documents would present arguments as to *why* technologies should be implemented in schools across the board (ITU 2005, p.15). These days, the question seems to have become almost redundant (Beck, 2011) and there appears to be a broad consensus that technologies have the capacity to *enhance learning*. Terms and phrases like *technologies for learning* and *pedagogical use of digital tools* permeate contemporary educational discourse, displaying an instrumental orientation in which the purpose of technology use is to learn other things (Erstad, 2010; NOU 2013), and learn them better. A main concern is finding and facilitating the optimal circumstances for this to happen. In this, technology is rarely an object of study in itself (Johannesen, Øgrim & Giæver, 2014).

An unfortunate side effect has emerged from this. It has left teacher education with little room to raise important discussions about technology and about the ways technologies and forms of technological agency might work upon the conduct of human actors. For instance, how and where should it be addressed that technologies (both digital and non-digital) possess their own material properties that shape and alter 'content' and that predispose what can be done with and against them? Most teachers' experience is that the choice of slide software or interactive whiteboards over chalk on a blackboard affects not only learners' engagement but also 'the stuff of learning', that both 'what goes in' and 'what comes out' is affected by the particular constraints of each technology. Yet, such insights rarely rise above the intuitive level, as there is no place to reflect analytically on what such tools 'do'. That technologies inhibit physical qualities that allow or invite certain actions to be performed with or upon them is hard to express within received discourses based on a largely implied preeminence of human forms of agency.

In the present inquiry, it appeared as worthwhile to consider agency as residing not only in the human subject, but also in technological objects (Coole & Frost, 2010, p.10; Latour, 2007; Slack & Wise, 2015, p. 139–140). This does not imply the attribution to inanimate objects of motives and rational thinking, rather it is that they are, as coined by Latour

Idunn
Nordiske tidsskrifter på nett

(2007), *actants*. The point is, explains Coole (2013), that 'actants have efficacy: they make a difference, produce effects and affects, alter the course of events by their action; they may allow, encourage, authorize, influence, block, suggest and so on' (p. 459). Agency emerges through constant interactions of human and non-human components. Received human-technology distinctions can thus be subsumed under the notion of socio-technical networks (or 'assemblages') that enable and restrain multiple forms of human and non-human agency. As will be shown, this author's contention that the student teachers' logs discussed later in the present article revealed a growing awareness of precisely such a complex networked form of agency.

By not explicitly addressing technologies, we also eschew the fact that technologies are not neutral, but made by humans and intended for specific purposes, inscribed with certain values and biases of designers and manufacturers (Kitchin & Dodge, 2011; Srinivasan, 2013). While educational rhetoric still embraces ideas of digital 'producers' versus 'consumers', Schäfer (2011), among others, has drawn attention to the ways in which 'producers' more often than not assume roles as both consumers and co-producers, participating 'implicitly' even without their awareness. In a code-based, 'software society' (Manovich, 2013), technological awareness becomes an important prerequisite for agency; in fact, the concept loses its relevance unless reconfigured and understood within a broader perspective that involves technological as well as economic and political aspects (Coole and Frost, 2010; van Dijck, 2009; Pötzsch, 2017). As many researchers are now arguing, an understanding of the inherent agency of software and algorithms is particularly crucial for anyone involved in education (Saariketo, 2015; Pötzsch, 2016; Williamson, 2014).

If the purpose of technology in education primarily becomes to 'support and enhance' learning, technologies that do not comply with these goals will be dismissed. Wikis are a case in point: on the one hand hailed as particularly interesting for educational purposes (Bower *et al.*, 2006; Lamb, 2004), and on the other deemed notoriously 'difficult'. In essence, wikis are highly flexible tools that facilitate a wide range of uses. They enable instant web publishing of various types of content, and by first glance a wiki may look like any other web site. Yet, due to the basic principle of shared authorship it functions in radically different ways. Unlike for instance blogs, a wiki is quickly and easily editable by any author (given rights and access) so that any type of content can be added to, altered or deleted by anyone, regardless of who put it there initially. The fact that wikis allow 'empty' links (marked textual content that takes the user to 'a page that doesn't exist') is what primarily sets them apart from other, seemingly comparable tools. When arriving at a page that 'does not exist' the user is invited to open that page: users may thus not only add content on equal terms but also influence where new pages are to be created and that way also decide the site's structure and range.

Despite these interesting features, wikis are rarely used in education. Principles like equality, transparency, incompletion and constant change characterize wikis, and may create tension when faced with traditional educational practices such as individual assessment, closure and completeness (Lund & Smørdal, 2009). In my own experience, many teachers who are initially enthusiastic when discovering what wikis are capable of tend to give them up quickly, finding them too complex or troublesome for daily classroom routines. There are in fact few arguments available for why teachers should want to use wikis.

Idunn
Nordiske tidsskrifter på nett

In the present educational climate, such a technology has no immediate value, however, as will be argued here, working with wikis may have a series of other, less obvious benefits that may prove particularly relevant for student teachers assuming wider perspectives on technology, such as an awareness of the emergent complexities of human-non-human interaction in contemporary digital networks.

'The Pedersen family chronicle' wiki

The following reports from a wiki project with a group of undergraduate student teachers enrolled in a Norwegian course. The group consisted of thirteen students between twenty-one and twenty-eight years of age who spent a total of seven hours working on the wiki over a two-week period. The assignment was developed in collaboration with the group's subject teacher and served as a component in their regular coursework, 'Text and genre in a digital world'. In addition to being a way to address genre writing, the wiki was meant to serve as an example of a 'digital teaching method' for students to develop further in their own teaching. As such, it was partly a rather typical setup in which teachers 'do something digital' in order to meet the requirements of the curriculum.

The assignment was based on a model involving the use of a free online wiki platform and a modified version of the *Storyline* method (Creswell, 1997; Bell et al., 2007). In this task, the students were asked to develop a fictitious family chronicle on a wiki, using only an image as their starting point. Before meeting the students, the subject teacher and the researcher (the present author) had decided on a rough framework for the wiki: it was to revolve around a typical Norwegian family and should be set in three different time periods: 1946, 1972 and 2012. We had decided on a black-and-white photograph with an unmistakable 1970s feel to it, depicting a youngish-looking man. Apart from this picture and the specified years, it was left to the students to decide the developments of characters and the plot that would gradually emerge around them.

The work consisted on three phases, using three different technologies: brainstorming accompanied by PowerPoint, drafting through collaborative pads, and wiki writing using the free online wiki platform wikidot.com. The brainstorming was led by the teacher in class, in which the students were presented with the man's picture displayed on a large canvas and encouraged to bring forth suggestions as to this identity, personality, history and community. The teacher repeated each suggestion, and with the group's approval either rejecting or supporting the various ideas so that a coherent, common story was created. This way, the fictitious character of 'Steinar Pedersen' was brought to life, together with a set of family members, friends and colleagues in the fictitious community of 'Maurskog'. In the next, drafting phase, the students divided into groups and started fleshing out their parts of the Pedersen universe, using real-time editing collaborative pads. These texts were to provide the raw material for the basic infrastructure of 'The Pedersen Family Chronicle' wiki.

Idunn
Nordiske tidsskrifter på nett

Picture 1 The front page of the wiki as the students first encountered it.

After the first session, the teacher and the researcher set up an infrastructure for the wiki, based on the students' texts from the collaborative pads. A plain layout with a limited set of features available was chosen.[1] The picture of Steinar Pedersen was placed in the centre of the front page:

Next to the picture, we put down the basic facts about Steinar as hyperlinks, corresponding to the material the students had developed so far. The idea was that students should meet their texts again, this time on a wiki, and start editing from there. At the bottom of each page, we suggested titles for new pages: on the 'Ruth' page (Steinar's mother), for instance, we added titles like 'Ruth's diary', 'Ruth's best recipes', 'Ruth's Crafts booklet', and 'Hat fashion this spring' (from the April 1972 edition of a woman's magazine). Through titles such as these, the students were to start expanding the wiki universe through texts which required looking up historical facts, searching for model texts and suitable images.

From this point on, the students were free to develop whichever part of the wiki they wanted, either add to or improve to the texts that are already there, or develop new directions through links in the texts or by suggesting new titles for genre texts. The only interference from us teachers was the introduction of two more pictures (one in a 1940s appearance, the other one contemporary) and adding the years *1972* and *1946* to the sidebar menu. During the 4-day span the students created nearly 100 separate pages of texts and images attached to the fictitious Pedersen universe: obituaries, diary entries, news reports, postcards, poems, songs, speeches, parent-teacher correspondence, job applications, advertisements, roadmaps, menus, and party invitations, all intended to assume the historical flavor of either 1946, 1972 or 2012.

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1. The top menu bar was made to include only a few, select features: a link to a "What is this"-page where the project would be briefly explained with a list of the students' first names. Tabs to "all pages" and "latest changes" were kept from the original template as we considered them useful aids for navigation and for getting an overview of the developments that were to follow.

DATA COLLECTION

The students were interviewed individually several months after the project's conclusion. The interviews lasted between thirty and forty-five minutes, and were later transcribed. In order to freshen their memory and provide starting points for conversations, the researcher provided printouts of samples of the texts as well as recorded histories of the pages each of them had contributed to. The semi-structured interviews were conducted in a relaxed, conversation-style manner. The aim was to allow students to describe as many aspects of the project as possible, and bring up whatever topics they would be interested in addressing. A few set questions were nevertheless given to all, questions that tuned in to the larger study's original research focus of how wikis could function as a tool for learning and enhance students' digital competence.

After each of the three wiki sessions, the students also wrote brief log on their personal user pages on the wiki. The idea behind the use of logs was primarily to enable students to monitor their own efforts and to have them commit to the task. The logs were collected and saved as possible sources of data, yet considered to be of lesser relevance than the data that would emerge from the interviews. The students were therefore simply asked to 'write something' after each in-class wiki session, framed in a 'what did I do today' and 'how was it' format. The only exception was after the third session, where they were given a set of topics to respond to if they should wish, mostly intended as support for their writing. The number of collected entries counted 32 in all, varying in length between 117 and 820 words.

FINDINGS AND ANALYSIS

Interviews

The students were generally very communicative in the interviews, and talked in positive terms about the creation of characters, plots and texts of different genres. None of them bring in technology as a topic unless explicitly asked. When asked, they say mostly positive things ('fun to try out', 'interesting', 'different'). When asked to respond to whether the project had developed their digital competence, they primarily refer to having acquired practical ICT skills, such as 'having learnt how to insert pictures' or having 'learnt about Creative Commons licenses'. None of the respondents address the qualities of the wiki technology. Some express interest in 'doing something similar' in their own teaching, but would consider 'an easier tool'. When asked about the project's relevance for other subjects, one student suggested that a wiki could be used in Science teaching, 'to compile lists of birds' names'; another mentions how it could be used in Social Studies 'to create an assembly of texts related to World War II'.

These responses were both unexpected and, admittedly, a little disappointing. In class, many of them had talked about the uniqueness of the project and that it had been a rare experience behind the user interface, where they had performed quite advanced operations, such as manipulating codes. In the interviews, the wiki seemed to have lost this uniqueness and was spoken of as any other publishing tool. Although they were positive about the project it seemed as though they regarded it as an entertaining sidetrack with little educational value. Many said the project had 'made writing fun', but this was quite con-

sistently attributed to the fiction frame and not to the technology. Yet, another look at the logs proved to show quite different findings.

Logs

The students' logs were not subjected to analysis until several months after the project's conclusion, and after the interviews had been carried out. At the first reading it became clear that when the students could address 'anything they like' they all addressed how the characteristics of wiki technology had played a part in their writing. Applying an open coding approach (Strauss & Corbin, 2015) to how they talk about their first wiki encounter, I first began by arranging the students' statements into two categories: *awareness* of the wiki's affordances and *willingness* to express opinions about these affordances. These two categories were present in one or more entries from all of the thirteen students involved. In the following, translated excerpts from the logs are presented in the form of unaltered statements that appear with considerable frequency and that typically illustrate these two categories (the texts that did not fall in to either of these categories were mostly descriptions of their activity and are left out here).

The log entries from the first wiki session show that nearly all of the students comment the wiki being different from other technologies they have worked with: 'this is a new and exciting way to write'. At this point, they have all learnt how to create hyperlinks and new pages and all express some form of excitement about the way this allows for a rapid expansion of the site:

> This wiki is really developing fast! Everyone is really *caught up in this*, being creative and enthusiastic. We add to each other's pages and improve them. It's fascinating to see *how one new page soon turns into five new ones*.
> It is such fun to see *how the wiki just keeps evolving* while we're working on it.
> There really seems to be no end to *how far it can go*!

The italicized parts of the quoted passage show how the students increasingly assign agency to the technologies they work with. Human actors are, as such, presented as 'caught up in this', pages simply multiply apparently by themselves, while the wiki itself 'just keeps evolving'.

Many of them mention how the writing could be both individual and collaborative at the same time, connecting it to 'the way the wiki works':

> The way a wiki works is just perfect: you have space to do your own thing and follow your own interest.
> At the same time, you can follow what others do and pick up on that if you like.
> Having the freedom to develop links where you want, and follow up links made by others, really makes this so much fun.

The task did not require the students to edit each other's texts, and indeed, very few of them did. They nevertheless discover and seem to appreciate the advantages of being able to connect to texts written by others, such as adding a word or two on a page initiated by someone else so that they could link up to 'their' text. Especially in the second and third log entries, many of them comment on this possibility:

> a major point with writing on a wiki is the process of fixing each other's texts so that they all connect to each other logically
>
>> even if we could write on our own, the wiki tied us all together

For work with the logs, the students had not been asked to evaluate the technology, still all of the thirteen students did. Typically, they comment on what they liked or did not like about it, then add a sentence or two about the implications:

> I like that we can monitor both the process and the product of writing. Gives a clearer view that what each of us does actually takes the result further, makes it better

Some find the fact that wikis do not allow simultaneous, synchronous writing a problem: 'it's problematic if you just want to check a detail or make a small edit and that page is locked because someone else is busy editing it'. Then, the implications are considered: 'It's a pity in the sense that writing gets more solitary than with the collaborative pads.' Others see the same feature as advantageous:

> it's good because it gives the writer some peace of mind, like when you struggle with how to phrase something and want to try out various alternatives. That's a quite personal stage where you don't want other people meddling

Many such statements are present in the logs, in which opinions are expressed, consequences assessed and alternatives considered. As a researcher, I quickly recognized these expressions as agentic in a human sense. Yet, it also became evident that the students are fascinated by the way the wiki *allows, hinders, takes them further, opens up, develops, blocks*. Unlike the interviews, these logs show that agency is indeed assigned to technical tools.

DISCUSSION

The Pedersen wiki was very popular with the students who all, in both logs and interviews, assessed it as having been *fun*, *interesting* and *engaging*; some even claimed it was one of the most memorable highlights of their entire study. The history pages reveal that some of them kept adding to the site after class, in weekends, and even in the weeks after the project had ended. What role did they assign to the wiki technology in this? The data reveals obvious contradictions. In the interviews, the students do not address technology unless asked. When spoken of at all they address it briefly, quickly shifting topic to talk about the texts and the characters that were created. The wiki is implicitly treated as a tool serving particular purposes determined by human actors: it *could* be used to publish various types or content, although some would rather choose something 'easier'. In the logs, however, the students' enthusiasm seems closely connected to the technology. For one, they express confidence and pride in having learnt to operate a complex technology, and having discovered by their own accord how to manipulate the wiki code and how that affected the layout. Moreover, their logs show a recognition and appreciations of how the wiki technology itself asserted a form of agency upon them: that the wiki's affordances served as an integral and indispensable part of the story development.

Idunn
Nordiske tidsskrifter på nett

Nevertheless, such profound interest in technology and what it does to the 'stuff of learning' runs against the popular trend that technologies should not draw too much attention to themselves. Designers and producers of digital technologies strive to achieve a seamless interface and a smooth, frictionless experience that de-emphasizes technology and its complexities. This is often appreciated by teachers: in lower grades, tablets are often favoured over PCs because they switch on quickly and require less 'meddling'. What is gained is naturally a more comfortable user experience, but what is lost? Gert Biesta's (2005) point about the concept of learning seems appropriate here:

> Rather than seeing learning as the attempt to acquire, to master, to internalise, and what other possessive metaphors we can think of, we can also see learning as a reaction to a disturbance, as an attempt to reorganise or reintegrate as a result of disintegration. We can look at learning as responding to what is other or different, to what challenges, irritates and disturbs us, rather than as the acquisition of something that we want to possess (p. 62).

While a seamless interface does not draw attention to itself, the not-so-smooth technologies provide disturbance, and thereby opportunities for reflection. This resembles Heidegger's idea about tools and *tool-being*. According to Jackson (2014), Heidegger distinguishes between tools that are 'ready-to-hand' and those that are 'present-at-hand': 'in the former state, technologies function as anticipated, do and stay where they're supposed to, and therefore sink below the level of conscious reflection. In the latter, the material world resists, obstructs, or frustrates action, and therefore calls attention to itself" (Jackson 2014, 230). In the project described here, it is revealing that the ubiquitous PowerPoint technology that initiated the assignment passed unnoticed in these students' accounts.

Working with the wiki technology made the looming issue of agency in digital media ecologies visible and palpable to the students, at least implicitly. Not every wiki project will do the same. In the Pedersen wiki, the *task* was crucial, both how it was framed and what kind of writing it required. As teachers, we set the initial parameters but soon withdrew our authority. Soon it was the students who created the paths to be followed, and in doing this, gradually uncovered the agency of wiki technology that framed and predisposed their own creative endeavors. Working within a fictional frame also proved to be significant. While a fact-based wiki typically refers to a 'real' world in which there are right and wrong answers, the Pedersen wiki contained no such restrictions. Building the site was much more than 'filling gaps' in an already established terrain: it was a fiction in which 'anything goes'. Every contribution was allowed to create new forks in the narrative, which again sparked off new input from peers – all made possible by the wiki affordance of adding even 'empty' links. The fiction fit the wiki well. There were really no limits to what could be included, or where: a fictitious second cousin could be placed into any genealogy; a past or future romance could be accommodated for between any of the characters – even those not yet invented. This positioned the students as active parts in the creation of the site's structure as well as its content. It also made it particularly obvious to them that the wiki allows for specific actions that they as users may pick up on or ignore. While it was indeed the students' creative abilities that drove the narrative forward, the outcome of the wiki (the Pedersen universe) could not have been created without the wiki

Idunn
Nordiske tidsskrifter på nett

technology that performed as 'actant' in this particular, socio-technical network (Latour, 2007).

It was only in hindsight it appeared to me that the students' logs show more than enthusiasm with creative writing, and that they – at least implicitly – acknowledge a non-human form of agency operating upon their individual conduct. In the interviews, that were to serve as the main source of data, none of this was evident. Partly, this can be attributed to practical, methodological issues: the time factor is significant, so is the physical presence of a senior researcher with a microphone. Yet it also has to do with what questions were asked and what positions these had been informed by. It is significant that I as researcher could not at first make sense of the interview data and was slightly disappointed by their replies. The students had taken part in a project that involved new and experimental uses of technology, yet they were unable to somehow acknowledge this when interviewed. I could not understand how they could align their work with the wiki with other digital tools they had previously encountered, and how they could 'reduce' the wiki to something with which to compile 'lists of birds' names'. It was only after studying the logs that the main difference between the log and interview data became apparent. They had simply responded to questions which positioned technology as instrument, in which there were implied assumptions of cause and effect, and that wanted to document 'outcomes' and 'results' and find confirmations of something 'improved'. To this, the students could not truthfully claim that they had really 'learnt' anything particular. Obviously, they failed to 'translate' their wiki experiences to this rhetoric of technology-enhanced learning.

Thinking about technologies in instrumental terms is unfortunate for several reasons. It may hinder experimentation and innovation, and render technology encounters that do not have predefined goals as invalid or a waste of time. Technologies that do not act according to plan, provide resistance or fail to deliver improved learning outcomes will be dismissed in favour of well-trodden paths and reproduction of existing practices. But as Sørensen (2009) comments, 'only when we stop asking what technologies can do in terms of fulfilling human aims can we start examining how technologies engage in practice, in sometimes surprising and unforeseen ways, examining what was performed by and through the technologies in place of the expected outcomes' (p. 7). By examining 'difficult' technologies like wikis we also introduce the opportunity for challenging and demanding something from technologies. In order to become truly agentic, tomorrow's teachers need to experience that digital technologies are neither handy tools that can be implemented without consequence, nor systemic 'givens' beyond their comprehension or influence, but are parts of complex networks that combine both human and non-human actors and agencies in unprecedented manners.

CONCLUSION

This article has described a case involving the use of wikis that seemed to raise student teachers' interest and insights in the role played by technology. It has been argued here that these insights were enabled through a task that allowed and encouraged exploring the wiki's characteristic affordances. It has further been argued that these insights are valuable in teacher education as they challenge both received notions of a preeminence of human

Idunn
Nordiske tidsskrifter på nett

agency and techno-determinist ideas of omnipotent systems. As the findings indicate, wikis have a unique capacity to raise awareness for such issues in educational contexts. As such, they may contribute to the installment of students with a reflected and reflexive form of agency better suited digitally saturated contemporary societies.

Yet, for such insights to manifest themselves, a pedagogical setting is required that does not only focus on how technologies enhance learning outcomes. This article described an incidence in which both students and teachers in teacher education initially failed to recognize the significance of a human-computer interaction beyond instrumental terms. The incident may be representative for many, similar technology encounters. As such, it may suggest that the reported 'slow uptake' of digital technology in teacher education to some extent is discursive rather than objective. The encounter described here is not intended as a recipe for duplication, but as example of a kind of approach that should be considered when discussing the future role of technology in teacher education. We need more research into what kind of settings that give students opportunities to understand how humans and technologies interact, and how to find a place for these within our curriculums.

REFERENCES

Beck, E. (2011). Computers in education: what for? *Nordic Journal of Digital Literacy*, 6, 282–294.

Bell, S., Harkness, S., & White, G., (Eds.). (2007). *Storyline: Past, present and future.* Glasgow: University of Strathclyde, Enterprising Careers.

Biesta, G. (2005). Against Learning. Reclaiming a language for education in an age of learning. *Nordisk Pedagogik*, (25), 54–66.

Brox, H. & Ghezzi, C. (2010). Creating virtual worlds with meaning. Case studies of web 2.0 tools in higher education. Information Sciences for Decision Making 2010 (39). Retrieved from: http://isdm.univ-tln.fr/PDF/isdm39/Article_Isdm_Ticemed09_Brox-Ghezzi_OK.pdf

Brox, H. (2012). The elephant in the room: A place for Wikipedia in higher education? *Nordlit*, *30* (2): 143–155. doi: 10.7557/13.2377

Brox, H. & Jakobsen, I. (2014). Wiki, tekster og arbeidsmåter i morgensdagens engelskfag: et eksempel fra lærerutdanninga. *Acta Didactica, 8* (2), 1–17.

Brox, H. (2016). Troublesome tools. How can Wikipedia editing enhance student teachers' digital competence? *Acta Didactica, 10* (2), 329–346.

Buckingham, D. (2006). Defining digital literacy – what do young people need to know about digital media? *Nordic Journal of Digital Literacy*, *1*(4), 263–276.

Creswell, J. (1997). *Creating worlds, constructing meaning: The Scottish Storyline Method.* Portsmouth, New Hampshire: Heinemann.

Dijck, J. van (2009). Users like you? Theorizing agency in user-generated content. *Media, Culture & Society, 31*(1), 41–58.

Erstad, O. (2010). Media literacy and education. The past, present and future. In S. Kotilainen & S. Arnolds-Granlund (Eds.), *Media Literacy Education. Nordic Perspectives* (pp. 15–27). Gothenburg: Nordicom.

Ferrari, A. (2012). *Digital competence in practice: An analysis of frameworks*. Seville, Spain: Institute for Prospective Technological Studies, European Commission. Retrieved from http://www.ifap.ru/library/book522.pdf

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Gudmundsdottir, G.B., Loftsgarden, M. & Ottestad, G. (2014). *Profesjonsfaglig digital kompetanse og erfaringer med IKT i lærerutdanningen.* Oslo: Senter for IKT i utdanningen.

Idunn
Nordiske tidsskrifter på nett

Haugsbakk, G. (2010). *Digital skole på sviktende grunn. Om nye muligheter og dilemmaer*. Oslo: Gyldendal akademisk.

Instefjord, E. (2014). Appropriation of digital competence in teacher education. *Nordic Journal of Digital Literacy*, *9* (4), 313–329.

Instefjord, E. & Munthe, E. (2016). Preparing pre-service teachers to integrate technology: an analysis of the emphasis on digital competence in teacher education curricula. *European Journal of Teacher Education*, *39* (1), 77–93.

Jackson, S. (2014). Rethinking repair. In T. Gillespie, P.J., Boczkowski & K. A. Foot (Eds.), *Media Technologies. Essays on Communication, Materiality, and Society*. MIT Press.

Jenkins, H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century*. Cambridge: MIT Press.

Lankshear, C. & Knobel, M. (Eds). (2008). *Digital Literacies: Concepts, policies and practices*. Peter Lang Publishing Inc.

Lipponen, L. & Kumpulainen, K. (2011): Acting as accountable authors: Creating interactional spaces for agency work in teacher education. *Teaching and Teacher Education*, (27), 812–819.

Lund, A., Furberg, A., Bakken, J. & Engelien, K. (2014). What does professional digital competence mean in teacher education? *Nordic Journal of Digital Literacy*, *9* (4), 281–299.

Lund, A. & Smørdal, S. (2006). Is there a space for the teacher in a WIKI? *Proceedings of the 2006 international symposium on Wikis,* August 21–23, 2006, Odense, Denmark. doi: 10.1145/1149453.1149466

Lund, A., Rasmussen I., & Smørdal, O. (2009). Joint designs for working in wikis – A case of practicing across settings and modes of work. In H. Daniels, A. Edwards, Y. Engeström, T. Gallagher, & S. R. Ludvigsen (Eds.), *Activity theory in practice –promoting learning across boundaries and agencies* (pp. 206–229). London: Routledge.

Manovich, L. (2013) *Software Takes Command*. New York et al.: Bloomsbury.

Nardi, B and O'Day, V. (2000). *Information Ecologies. Using technology with heart*. MIT Press.

NOU 2013:2 (2013). *Hindre for digital verdiskapning*, Del 6: Digital kompetanse. [Obstacles to digital economic growth, Part 6: Digital competence]. Retrieved from https://www.regjeringen.no/no/dokumenter/nou-2013-2/id711002/sec1

Pötzsch, H. (2016). Materialist Perspectives on Digital Technologies: Informing Debates in Digital Literacies and Competences. *Nordicom Review*, *37*(1), 119–132. doi: 10.1515/nor-2016-0006

Rimmereide, H., Blair, B. and Hoem, J. (2011). Wiki Storyline in Second Language Teaching. *Seminar.net, 7* (2). Retrieved from http://seminar.net/index.php/volume-7-issue-2-2011/193-wiki-storyline-in-second-language-teaching

Røkenes, F. M. & Krumsvik, R. J. (2014). Development of student teachers' digital competence in teacher education: a literature review. *Nordic Journal of Digital Literacy*, *9*(4), 250–280.

Saariketo, M. (2014). Imagining Alternative Agency in Techno-Society. Outlining the Basis of Critical Technology Education (pp. 129–138) in L. Kramp, N. Carpentier, A. Hepp, I. Tomanić Trivundža, H. Nieminen, R. Kunelius, T. Olsson, E. Sundin, & R. Kilborn (Eds.), *Media Practice and Everyday Agency in Europe*. Bremen: Edition lumière.

Saariketo, M. (2015). Reflections on the question of technology in media literacy education. In S. Kotilainen, & R. Kupiainen (Eds.), *Reflections on media education futures: contributions to the Conference Media Education Futures in Tampere, Finland 2014.* (pp. 51–61). Göteborg: The International Clearinghouse on Children, Youth and Media, University of Gothenburg, Nordicom.

Schäfer, M. T. (2011). *Bastard Culture. How User Participation Transforms Cultural Production*. Amsterdam University Press.

Teo, T., Lee, C.B. & C.S. Chai (2007). Understanding pre-service teachers' computer attitudes: applying and extending the technology acceptance model. *Journal of Computer-Assisted Learning. 24* (2), 128–143. doi:10.1111/j.1365-2729.2007.00247

Idunn
Nordiske tidsskrifter på nett

Thomas, M. (Ed). (2011). *Deconstructing Digital Natives. Young people, technology and the new literacies.* London and New York: Routledge.

Tømte, C., Kårstein, A., & Olsen, D. S. (2013). *IKT i lærerutdanningen. På vei mot profesjonsfaglig digital kompetanse? [ICT in teacher education. Moving towards a professional digital competence?].* Oslo: Nordic Institute for Studies in Innovation, Research and Education.

Idunn
Nordiske tidsskrifter på nett