UPPER SECONDARY SCHOOL TEACHERS' COLLABORATIVE LEARNING ABOUT DIGITAL TECHNOLOGIES — A RESEARCH CIRCLE.

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Abstract

Teachers' use of digital technologies continues to increase in schools. For many teachers, possibilities to collaboratively deepen knowledge in the understanding and use of digital technologies are limited. This paper reports on upper secondary school teachers' work in a research circle for professional development in digital technologies. The teachers in this research circle reported new knowledge in the area of digital technologies, which involved insights into policy documents, theories and models related to the use of digital technologies in schools, and concrete examples of how to support the use of digital technologies in practice in their schools. Continued work in research circles could involve increased support of teachers' responsibility for and ownership of the work in digital technologies.

Digitalization in Teachers' Practice in the Swedish Context

As in many schools, digitalization continues to increase. Swedish National IT strategy (The Swedish Committee for Digitalization, 2014) and the Swedish National Digitalization Strategy for Schools (Swedish Government, 2017) were introduced to support the use of digital technologies in schools. Using the concept of adequate digital competence, the responsibility for advancing digitalization in schools as organizations was placed in focus. This concept comprises the responsibility for all school staff to support students' adequate digital competence. The Swedish National Agency for Education (henceforth, NAE) reported the need for professional development in the area of digitalization on all levels of Swedish schools (Swedish NAE, 2016). The Swedish NAE (2023) defines digital competence as involving four aspects: *to understand the impact of digitalization on society, to be able to use and understand digital tools and media, to develop an approach that is critical and responsible,* and *to be able to solve problems and translate ideas into action* (here and elsewhere, translations are the authors').

Although the intentions in line with policy are strong, the definition of adequate digital competence continues to remain unclear (Olofsson et al., 2020).

Efforts to accelerate the uptake and use of digital technologies in schools through professional development for teachers continues to be in focus. The introduction of digital competence as a basic skill in the curricula for both compulsory and upper secondary schools was proposed (The Swedish Committee for Digitalization, 2014) to promote students' competence in the use of digital technologies. This trend is reflected in the need for teachers to consider the uptake and use of digital technologies through didactical design (Jahnke & Kumar, 2014; Olofsson & Lindberg, 2014) to enhance student outcomes.

However, despite this focus on advancing the use of digital technologies, the Swedish NAE (2022) reported that preschool teachers', teachers' and school leaders' work pointed to a gap between the intentions of policy and practice. More work needs to be carried out to advance the use of digital technologies in the classroom. According to the NAE (2022), a more systematic approach in the work in school is needed to advance digitalization. This work includes formulating and following plans for digitalization, mapping the current situation regarding professional digital competence, and exploring how digital tools and textbooks function in teaching (Swedish NAE, 2022).

Teachers are important in the work to advance the use of digital technologies in the classroom. Drayton et al. (2010) pointed out that teachers need professional development as well as time to discuss subject content, students' work activities, pedagogy and technology. This is in line with what Ertmer and Ottenbreit-Leftwich (2013) report, noting that teachers' activities regarding the uptake and use of digital technologies needs to shift from technology to pedagogy and that this takes time. Teachers need to be confident in their own abilities and to work in a school culture that supports professional development in technical, pedagogical, and subject-related didactic competences (Mishra & Koehler, 2006). Towndrow and Wan (2012) emphasize the importance of collaboration through sharing. Vrasidas (2015) argues that professional development must be collaborative and situated in teachers' everyday practice. Here, the role of the teacher is central (Hattie, 2009). Further, the importance of the teacher and the uptake and use of digital technologies appears to support the idea that the technology is not the agent of change, but the teacher is (Kirkwood & Price, 2014). The relationship between teachers' technology-related teaching skills and students' learning activities involving digital technology appears to be strong (Sailer et al., 2021). These researchers also note that teachers' skills are positively related to frequency and types of technology use.

A Research Circle in Digitalization

According to Persson (2009), the starting point for the research circle can be described as a dialog between researchers and professionals, which can provide a basis for developing teachers' own practice. Research circles are a form of continuing professional development. In a research circle, teachers are active participants, and reflection discussion has a central role. There is a strong connection between research and practice and mutual work between teachers and researchers (Furu & Sandvik 2019). The result of the research circle should lead to a new knowledge contribution. Moreover, it is important that a research circle should not be based on the teachers' lack of knowledge, but instead teachers' active exploration in learning (Pihlgren, 2019).

The research circle in focus was: *Digital technologies - opportunities and challenges. A research circle for secondary school teachers*. In this research circle the opportunities and challenges of learning and teaching with digital technologies in the classroom were explored. Here, many different perspectives and issues were formed, with the focus depending on the participants' (teachers') interests; to reflect on what digitalization means, how teachers can use digital technologies to increase students' opportunities to learn, and how teachers can collaborate on digitalisation to strengthen and develop digital competence and equity. Research on and experiences with, for example, learning and teaching with digital technologies, were presented. Furthermore, there was opportunity to plan and implement a small development project in practice. In the case of this research circle, this work took place in the form of a final product, which was a PowerPoint presentation that presented the accumulated work during the progress of the research circle. This paper reports on upper secondary school teachers' work in a research circle for professional development in digital technologies.

Method

The research circle in digitalization took place during 2021 from January until December. Five upper secondary teachers participated in the research circle with two researchers. All of the seven meetings took place in the web-conferencing platform ZOOM and for some three hours. The meetings were organized by the researchers, who also were responsible for documentation. The first meetings of the research circle comprised reading steering documents for schools in digitalization. After a number of meetings, the teachers decided to focus on more specific literature (Sjöblom & Jensinger, 2020).However, the content of the different meetings was decided among the teachers in line with what they found was necessary to learn in their practices in regard to digitalization. Each meeting ended with a short review of the meeting and planned work and reading for the next

meeting. In most cases, this work involved planning what to read and to summarize for the group. During the last meeting the final product, as decided by the teachers in the group, was presented.

In this paper, letters written by the teachers are presented. At the end of the research circle, the teachers were asked to write a letter to summarize their learning experiences in reflection (Bie, 2014; Schön, 1987). These letters can be characterized as *learning reflections* (Moon, 2006). All five teachers who took place in research circle wrote a letter. These letters are identified as (T1-T5). In total the letters comprised some 130-409 words. The letters were then analysed using reflective thematic analysis (Braun & Clarke, 2019).

Results

In this section, the results are presented. The following four themes emerged: *Own learning; Literature and discussions; Theory and practice;* and *Continued work.*

Own Learning

In the theme *Own learning* the teachers reflected upon their own learning as a result of the work in the research circle. This involved their own learning about digitalisation as well as opportunities for collaborative learning: "I have learned a lot about how to think about digitization and peer learning. That it is important to think long-term and strategically and that this is usually lacking in the school world" (T1). The research circle provided time to reflect more strategically on digitalization.

Another teacher expressed their own learning as becoming more confident in the area of digitalization as a learning process in the research circle:

> This course has given me a more solid foundation to be able to define digitalization in society and especially in schools. The course, through literature, lectures and discussions has developed my knowledge of what digitalization is and where we are heading. I spontaneously feel that I personally have gained a solid understanding and that I can show/inform my colleagues to some extent. (T2)

However, their own learning did not necessary only mean new content, but a better base of knowledge in policy and research in the area of digitalization. This new, own learning sparked interest for further studies:

> I do not feel that I have learned a lot of new things, in terms of facts, but I have gained a stronger base of what I already had and feel more grounded in research in my opinion, which was one of the main reasons why I wanted to attend the circle. I also feel that I have more ways to find relevant research in the future. I am grateful for that. An old dream of doing a PhD has also come back, but with a different focus than before. (T3)

The researchers who led the research circle were also seen to have provided guidance and structure for learning: "You have shown the way in a gentle way, where we have largely been able to control the content. If nothing else, you at least made me feel that way, even though I think you had a little plan, which you planted in a nice way" (T4). One teacher also noted their own learning would perhaps have been supported by doing the research circle with a colleague: "I don't think it matters so much that I was the only one from my school, although it would have been desirable for more teachers from [my school] to share this journey with me" (T1). Participation in the research circle also involved seeing new perspectives: "I think the research circle has given me many useful thoughts from an organizational perspective. I have thought a lot about school development but also of course from a teaching perspective, but I think my focus has broadened through my participation in the circle" (T5).

Literature and Discussions

In the second theme, *Literature and discussions*, the teachers reflected on the literature as well as collaborative discussions on the literature: "The most rewarding and stimulating thing has been to study good literature together and share thoughts and discussions" (T2). As one teacher noted, the discussions on the literature led to deeper learning over the course of the research circle: "During the course of the circle, I have experienced that the discussions and materials we have worked with have given me insights and clarity on several issues" (T3).

The research article also provided the possibility to read and discuss important policy documents:

> Links to articles, documents, movies have all felt very relevant and inspiring. And I really appreciated that you brought up the national strategy, for example. I've done a lot of work on it in the past, but managed to put it in the bottom drawer of the oblivion bureau. (T4)

One teacher saw the book as the most important literature: "What I appreciated most was probably the book. It is very clear and practical. It has given me a structure for how I should think in different processes. Things that I probably knew, but now had to refine, reflect on and clarify" (T4). The teachers also appreciated the

possibility to choose the literature and the path of learning by themselves, although with support from the leaders of the research circle: “It was positive that we got to set the direction ourselves, and that it took a few meetings before we got there. I think you have been very good ‘companions’ in that” (T5). The same teacher commented on the learning environment as supportive: “I think we have had a good climate in the group, and I think you have contributed a great deal to this with your approach. We have had very rewarding discussions, I think that what we have done is much of what is missing in the profession, there is rarely time for that” (T5).

Theory and Practice

In the third theme, the teachers reflected on *Theory and practice*. Here the teachers saw the research circle as a possibility to combine theory and practice. The research circle provided relevant research in digitalization which could be merged with practice in school: “You have led us through this circle in a very good way and we have alternated theory with practice in the schools in our county” (T1). This was also linked with supporting student learning and equity: “The theory studied provided insights into how to support students’ learning as well as important issues such digitalisation as a tool for equity” (T3). The importance in integrating theory and practice was also seen to be important for student learning:

> To a large extent, I can apply and understand the importance of digitalisation for the individual in the school and then I think primarily about the student. The knowledge is also that together we are strongest, a company, a school, a society is not stronger than its weakest link. Equity, which is a very essential part of the state's plan for digitalization, is of great importance, and probably the most important part to develop (I think)." (T2)

Another teacher expressed the work as being concrete, pragmatic and situated in everyday work:

> The working method of discussing and making presentations in groups also felt good. It made it a bit tangible and suits me, who is very practical and hands on, very well. It allowed me to imagine myself in a real situation and move on from there. A bit like when I am a process leader in action research, which is also very much rooted in real everyday life." (T4)

The research circle also linked theory and practice by inviting a school leader to describe the work in digitalisation in practice: “I think it has been positive to be able to take part in *mixed* findings, the book of course, but also [the] lecture and the presentation by the principal on practical experiences. Good mix of research from several perspectives and a little more hands on, actual experiences” (T5).

Continued Work

In the theme *Continued work*, several of the teachers also reflected upon future work and the next steps they hope to take in their school practices. One teacher spoke of information and dissemination to others in the school organization: “I will now try to arrange a meeting with school leaders and quality developers to share the journey made within the framework of this research circle” (T1). The work with the final product was also seen as valuable as it was possible to adapt to different contexts: “In the end, it actually became a working material to take with you. Adaptable and with slightly different inputs, depending on the fact that we all think differently, where I can mix and match based on the conditions that exist on specific occasions” (T4). Another teacher expressed this same thought of the final product as a useful product in practice for the continued work: “The final product feels like it can fit in many contexts, even if we all took a slightly different approach to the task, I think it turned out very well overall” (T5). The research circle also inspired reflection on continued work as a teacher: “Thanks to the circle, I have also started to think more actively about what I want to work with in the future” (T3).

Discussion

This paper reports on upper secondary school teachers’ work in a research circle for professional development in digital technologies. In this study, the teachers’ learning reflections showed that teachers’ own learning in the research area of digitalization had increased from an individual perspective and from an organization perspective. Teachers also spoke of increased confidence. The literature and the discussions supported the work and provided a knowledge based in research. The final product, which was the result of the collaborative work during the research circle, was seen as useful, flexible, and possible to adapt to their own context. Thus, the work in the research circle was seen as valuable to combine research in the area of digital technologies and their own teaching in school, i.e. theory and practice. Finally, continued work was seen as dissemination of the knowledge gained in the schools as organization.

In the case of this research circle, upper secondary school teachers’ use of digital was expanded and advanced through professional development in the use of digital technologies to support students’ learning. This work may support teachers’ didactical design (Jahnke & Kumar, 2014; Olofsson & Lindberg, 2014). The study of policy and models could also be seen to support this in line with the intentions of policy (Swedish NAE, 2022). Here, teachers are important to support students’ learning through the use of digital technologies as well as being an active agent of change (Hattie, 2009; Kirkwood & Price, 2013).

For many teachers, time and possibilities to work collaboratively is important (Drayton, 2010). In this study, teachers reported deeper knowledge in the understanding and use of digital technologies as a result of the time to participate and discuss together (Towndrow & Wan, 2012). A research circle provides teachers with the opportunity to meet and discuss an area of joint interest based on research literature together with researchers, i.e. research meets practice (Persson, 2009; Furu & Sandvik, 2019)

The teachers in this research circle reported new knowledge in the area of digital technologies, which involved insights into policy documents, theories, and models related to the use of digital technologies in schools and concrete examples of how to support the use of digital technologies in practice in their schools. For example, in this study, the final product was seen and important as both a documentation of the progress of the work in the research circle as well as a product that could be used in practice to support colleagues understanding of and work with digital technologies. As the teachers are responsible for the choice of literature and reading assignments, the tasks are planned collaboratively by the teachers and researchers. This is in line with Vrasidas' (2015) ideas of the importance of professional development. This professional development can be seen to strengthen teachers' technology-related teaching skills and students' learning activities involving digital technology (Sailer et al., 2021).

Finally, from the perspective of the researchers involved, the work in the research circle appeared to deepen the discussions and knowledge of the teachers as a mutual learning experience (Persson, 2009; Furu & Sandvik, 2019). Continued work in research circles could involve increased support of teachers' responsibility for and ownership of the work in the research circle as an exploration in learning (Pihlgren, 2019). Further development could also be a research circle on digital technologies with an action-based research design.

Limitations and Future Research

This study reports on teachers' professional development in research circle in digital technologies. As the sample of the study is small, future research could involve larger groups of teachers who participate in research circles. In depth interviews would be one method to gain more information on how teachers reflect upon research circles as a form of active professional development which combines theory and practice. Further studies could involve teachers work with digital technologies using an action-based research design.

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