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# Digitalization and school leadership: on the complexity of leading for digitalization in school

Digitalization  
and school  
leadership

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## Abstract

**Purpose** – Digitalization has permeated society and schools. In this process, focus has turned to the importance of school leaders in their leadership for digitalization. The purpose of this paper is to explore how school leaders understand digitalization and the digital competencies needed in leading for digitalization in Swedish schools.

**Design/methodology/approach** – Open questions from reflective learning journals ( $n = 32$ ) and interviews ( $n = 8$ ) conducted with school leaders were used to explore how school leaders understand digitalization and the digital competencies needed in leading for digitalization.

**Findings** – The findings show that school leaders see digitalization as a wide and complex concept including technical, pedagogical, administrative and organizational challenges at all levels of the school organization.

**Practical implications** – It appears that the role of the school leader, as a complex task, has become more complex as a result of digitalization. How time, resources and professional development are made available to support school leaders in their work with leadership for digitalization in order to support teachers' and students' learning.

**Originality/value** – This paper contributes to the area of school leadership and digitalization. The research contribution is of interest for school leaders and school organizers striving to implement and advance digitalization in schools. This also concerns the prioritization of digitalization as one of many important areas in schools as organizations.

**Keywords** Principals, School leadership, Information and communication technology (ICT)

**Paper type** Research paper

## Introduction

In recent years, the Swedish Government and municipalities have invested heavily in the digitalization of schools, e.g., 1:1, laptops and information and communication technology (ICT) systems (Grönlund, 2014; Håkansson Lindqvist, 2015a; Tallvid, 2015). Despite these strong efforts, the impact on teaching and learning continues to be somewhat vague (National Agency for Education, 2016). Every three years, the National Agency for Education evaluates the implementation and use of digital technologies and digital competencies in Swedish schools. In the report from 2016 results have shown that investments and access to digital technologies have increased, however, pedagogical development and digital competencies appear to have fallen behind (National Agency for Education, 2016; Swedish Schools Inspectorate, 2012).

In order to adapt the education system to the requirements of the digitalized knowledge society, national efforts in promoting the uptake and use of ICT in Swedish schools have been implemented over many years (see Jedeskog, 2007; Håkansson Lindqvist, 2015a; Tallvid, 2015), but have mainly placed teachers and students as the focus. Supporting strategic leadership in leading for digitalization in schools was presented in 2002 (Ministry of Education, 2002). Proposals to strengthen digitalization in schools were further articulated in the Swedish National IT-strategy (The Committee for



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Digitalization, 2014) and the Swedish National digitalization strategy for schools (Swedish Government, 2017) in terms of adequate digital competency. In line with the new policy documents, adequate digital competency is also relevant for school leaders. Moreover, the National Agency for Education pointed out the necessity for professional development (PD) in the area of digitalization for all levels of Swedish schools (National Agency for Education, 2016). Here, the role of the school leader and the school leaders' digital competencies to lead strategically for digitalization and pedagogical development appears to be a key factor. Although a report regarding school leaders' digital competency to lead the strategic work with digital technologies has increased since 2009, one-third of all school leaders stated they do not have sufficient skills (National Agency for Education, 2016). Knowledge in how school leaders understand and conceptualize digitalization and what competencies appear to be important for school leaders to lead for digitalization seem to be an additional requirement. Here, it is important to note that, in the Swedish school context, while the responsibilities for school leaders have increased, many school leaders do not always have administrative support.

With this short background, this paper will focus on how school leaders understand digitalization in Swedish schools. Using Dexter's four categories for strategic leadership, including setting the direction, developing people, developing the organization, and developing teaching and learning, this study aims to explore how school leaders understand digitalization and the digital competencies needed in leading for digitalization in Swedish schools. The following research questions are put forward:

*RQ1.* How do school leaders understand what is meant by digitalization in their profession as school leaders?

*RQ2.* What PD seems to be needed to support the work in leading for digitalization?

This paper aspires to contribute to knowledge related to school leaders' understanding of digitalization as well as areas of interest for PD with the work in practice of leading for digitalization. In this paper, school leaders refer to school leaders working as principals and vice principals working in pre-schools, compulsory and upper secondary schools.

### **Leading in the midst of digitalization**

There has been a rapid growth of digital technologies in today's knowledge society (Selwyn and Facer, 2014). In many schools, the implementation of digital technologies has been in the form of 1:1, i.e., one student one laptop initiatives, in which teachers and students use laptop computers for teaching and learning (Balanskat *et al.*, 2013; Zheng *et al.*, 2016). Positive outcomes such as increased student engagement (Bebell and O'Dwyer, 2010; Penuel, 2006) and more possibilities for students in their schoolwork (Lei and Zhao, 2008) are reported. However, as Weston and Bain (2010) argue, improved outcomes related to the implementation of technology will not come about by themselves. In this process, the teacher is important (Bebell and O'Dwyer, 2010) as well as the school leader (Dexter, 2008). Concerns about school leaders' abilities concerning preparation (Afshari *et al.*, 2012; Schiller, 2003) as well as the lack of leadership (Flanagan and Jacobsen, 2003) have been expressed. Dexter (2008) means for example that the most important issue in the digitalization in schools is to be informed and to have effective school leaders. Further, Freeman *et al.* (2017) acknowledge the importance of school leaders in sustaining innovation and new innovations.

#### *Digitalization and school leadership*

Olofsson *et al.* (2011) discuss school leaders' need to consider how to steer or support the use of digital technologies. High expectations from society and stakeholders may lead to school

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leaders who experience the digitalization work as “challenging and difficult” (Olofsson *et al.*, 2011, s. 117). Following this line of thought, Schrum and Levin (2016) report a more complex leadership in the midst of constant change and must be taken on simultaneously. Flanagan and Jacobsen (2003) summarize this: “It is understandable that principals feel overwhelmed by the expectations inherent in their new responsibilities” (s. 140). At the same time, school leaders’ leadership for digitalization is imperative to support appropriate pedagogical use. Ottestad (2013), echoing findings reported by Law (2008), shows that school principals’ leadership and vision for pedagogical use of ICT take part to a large extent through the influence that the school leaders have on technological and pedagogical support as well as technology infrastructure.

In terms of complexity, Chua Reyes (2015) reported how school leaders navigated ICT educational reform. Here, school leaders described shifting identities, emerging roles and ambivalent capacities when leading for technologies. These school leaders indicated that their role had changed “from leading a team of teachers who have been deliverers of knowledge toward leading a team of teacher facilitators” (Chua Reyes, 2015, p. 378). From another point of view, Starkey *et al.* (2017) reported that an education leader or system with the aim of targets to minimize the digital divide, face a “complex problem” (Starkey *et al.*, 2017, p. 10). Targeting the digital divide among students demands access to appropriate technologies and the necessary knowledge and skills to use these technologies for future participation in society.

### *School leaders’ digital competencies*

While the role of digitalization has increased in importance in both curricula and school management, successful implementation and the hopes for improved student outcomes appear to be linked to school leadership. According to Flanagan and Jacobsen (2003), many school leaders feel somewhat hesitant regarding leading technology implementation, as they may not have experience or formal training. They argue that if school leaders are expected to inspire and lead their organization toward the use of digital technologies, PD must be made available to school leaders (see also Schiller, 2003). Brockmeier *et al.* (2005) described this as a threshold regarding the digital competencies that school leaders must cross before feeling prepared to lead for digitalization. According to Anderson and Dexter (2005), school leaders need adequate technology skills for their leadership roles. Schiller (2003) reported wide variations concerning school leaders perceived technology competencies in practice, noting “huge variations” in perceived skills, and thus the need for PD for school leaders. This is a concern, as the ability to read and interpret data and create and use databases are “essential for those in leadership positions where use and interpretation of data is increasingly becoming a critical skills” (Schiller, 2003, p. 179).

Mishra and Koehler (2009) presented the Technological Pedagogical Content Knowledge (TPACK) model. The TPACK model, representing the digital competency needed when designing for digitalized teaching and learning, entails a complex interplay between teachers’ knowledge of content (CK), pedagogy (PK) and technology (TK). Mishra and Koehler’s model has also been used to explore the specific digital competencies and work of ICT leaders and coordinators. Here Avidov-Ungar and Shamir-Inbal (2017) added two important components when leading digitalization: organizational knowledge and leadership knowledge. This study points toward leading for digitalization, including systematic change in structures, cultures and practices at several organizational levels as part of digitalization, as a complex role requiring a broad and comprehensive digital competency related to all levels of the school organization.

Other research relevant for this study is Leithwood and Riehl’s (2005) framework of successful school leadership. In their study, Leithwood and Riehl (2005; see also

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Leithwood and Jantzi, 2006) argue that a competent and successful school leadership includes four functions. These functions are related to setting the direction including goals, norms and vision, developing people including educational support, supportive learning environments and development of learning cultures, developing the organization including organizational infrastructures that support learning and development, and developing teaching and learning including structures for pedagogical development. Over the years, there have been attempts to reconceptualize Leithwood and Riehl's (2005) framework to be used in a digitalized context, for example, as to understand aspects of digitalization and school leadership (Dexter, 2008; Petersen, 2014) and the development ICT policies in school and education (Vanderlinde *et al.*, 2012). Reconceptualization of the four functions has also enabled the analysis of strategic digital school leadership as a means to take advantage of digitalization and educational change in schools (Dexter, 2008; Petersen, 2014).

#### *School leaders and training in the Swedish context*

Also in Sweden there appears to be an emerging need for PD for school leaders' digital competencies in leading for digitalization in schools (cf. Grönlund, 2014; Håkansson Lindqvist, 2015b; Pettersson, 2018a, b), as well as for further research. In the Swedish context, research on school leadership is described as an important but neglected area of research (Årlestig *et al.*, 2016). The few studies, at hand, contribute to the idea that school leadership is important for the strategic implementation of digital technologies for teaching and learning in Swedish schools (Petersen, 2014, 2016). The importance of PD for school leaders in digitalization is also highlighted in one of several national school development programs (National Agency for Education, 2018a). Leading Digitalization (Leda Digitalisering) is a voluntary program directed toward school leaders and school organizers who are interested in gaining more knowledge in what digitalization can provide to for teaching and learning and school as organizations.

#### **Method**

As the focus of this study is on school leaders' understanding of digitalization and the competencies needed for leading such work, data were gathered from both learning reflections inspired by Moon's (2006) idea of learning journals and semi-structured interviews (Kvale, 2007). The learning reflections aimed to give school leaders the opportunity to reflect on aspects related to digitalization and the interviews to further deepen insight into these understandings. In this study, the learning reflections were mainly used to create a broad and comprehensive picture on how school leaders understand and conceptualize digitalization in school and understand what competencies are needed for driving what school leaders understand as digitalization. The learning reflections were based on two broad open-ended questions, concerning what is meant by digitalization for them in their profession as school leaders and what PD they felt would support their work in leading for digitalization. The learning reflections were conducted in January 2018 with 32 school leaders at the end of the Swedish National Principal Programme for school leaders.

To further deepen the analysis, interviews (Kvale, 2007) were conducted with eight school leaders, seven men and one woman. To structure and guide the talk, a semi-structured interview guide including four broad themes was constructed. Each theme, including a number of specific questions, was related to the themes and structure of the learning reflections. Telephone interviews were used due to the geographical distribution of school leaders in different areas of Sweden and to offer school leaders the flexibility to participate. In order to maintain focus during the interviews and to make it possible to return to the data, all interviews (lasting 30–80 min) were recorded.

In this study, Leithwood and Riehl's four functions of a successful leadership, as reconceptualized by Dexter (2008), were used as analytical categories to analyze what is meant by digitalization in their profession as school leaders, and what PD seems to be needed for leading for digitalization. In the analysis, data in the form of free text comments were coded and categorized according to the method of Hjerm and Lindgren (2010). Thereafter, the codes were analyzed and placed into the following four broad categories of meaning according to Dexter's (2008) and Leithwood and Riehl's (2005) framework : setting the direction, developing people, developing the organization, and developing teaching and learning. The analytical process resulted in a total of 12 subthemes. The school leaders' comments are reported as School Leader and number, (SL1-SL32), and the interviews with the school leaders are reported using fictive names.

## Results

In this section, the school leaders' understanding of digitalization and the digital competencies needed in leading for digitalization are according to Dexter's (2008) four categories: setting the direction, developing people, developing the organization, and developing teaching and learning. The results are summarized in Table I.

### *Setting the direction*

In this category, four subthemes are found: teaching for the future, school development, more efficient school organization and more than just technologies.

The school leaders see the importance of digitalization for preparing and supporting students for the future: "We prepare the students for technology in the information society and how they can use it in the best way" (SL6). This involves using digital tools for developing teaching for students and "supporting all students despite their difficulties" (SL7). This is also expressed as possibilities for more flexible teaching and learning in school: "I was visited by a parent who was euphoric, saying how great [the teaching] is and that education is working for the first time in her child's life" (Kim). One school leader expresses this responsibility: "I am responsible for developing and leading the work with digitalization for both students and teachers" (SL5).

For the school leaders, leading for digitalization involves school development "to drive school development [...] to work for the school of the future" (SL25). Here, the school leaders also see that the work with digitalization is closely intertwined with digitalization as expressed in steering documents and course plans. One school leader expressed this as: "Seeing that the school works with the digitalization [aspects] which are necessary. Programming is only one small part of digitalization; there are many other aspects as well.

| Category                         | Subthemes  |
|----------------------------------|--|
| Setting the direction            | Teaching for the future<br>School development<br>More efficient school organization<br>More than just technologies |
| Developing people                | PD for leading for digitalization<br>PD for teachers<br>Digital competency for students                            |
| Developing the organization      | Accessibility<br>New technology for administration and communication<br>New forms and structures for sharing       |
| Developing teaching and learning | Creating conditions for new forms of teaching and learning<br>Collegial learning                                   |

**Table I.**  
School leaders'  
understanding of  
digitalization and the  
digital competencies

The students must learn to use digital tools in all their subjects” (SL32), meaning that the entire school needs to be involved: “It is important that we have common values, so that when we work with digitalization, we have consensus regarding how and why we use it and that there is a purpose” (Kate).

Several school leaders discuss more efficient school administration, which is expressed as “finding efficiency/critical review of what we do on the intranet for achieving sustainable management of documentation” (SL9). Other school leaders see digitalization as a process, which is more than technologies or that goes beyond technologies. For example, several school leaders discuss digitalization in terms of administrative and cultural change: “Many people discuss digitalization and IT-development in terms of the IT or the technical part of digitalization itself, but my starting point is the psychosocial work environment; it is based on this aspect that we are pushing forward the development of digitalization” (Paul). Moreover, digitalization is about “systematizing and clarifying structures” (Kim).

### *Developing people*

In this category, three subthemes emerged: PD for leading for digitalization, PD for teachers and digital competency for students.

Many of the school leaders also note the importance of deep knowledge in the steering documents and course plans as a necessary form of PD: “We need to update ourselves on the new parts [IT policy document] which are needed and decide a plan what to do to move forward” (Victor). This was often related to their own needs for PD: “PD in the new knowledge requirements” (SL14), as well as the need to “update myself in the new knowledge requirements in the courses that have been changed” (SL18). Another school leader expresses the need for more personal knowledge from an educational and student perspective: “more digital competency is required about education as well as the student’s view of digitalization” (SL6). Another school leader expresses the need for PD in digitalization itself: “In order to lead digitalization, I must have knowledge about the concept” (SL2), as well as what digitalization could mean for “teachers’ work, technology, functions, etc., at the school” (SL23).

Some school leaders also discuss how the competencies needed to lead for digitalization are versatile and require a broad understanding of how organizational structures, practices and cultures work. In addition, knowledge about which specific digital competencies are needed on different levels of the school organization is necessary as well as the consequences on different levels in the organization: “This [digitalization] is an important issue in regard to leadership and culture” (Paul). Although most school leaders see a need for PD, a few of them are not clear about what PD is needed, e.g., “don’t know” (SL3). Some school leaders instead argue that it is more important “to have people employed to support aspects of digitalization” (Kim). Another school leader explains the following:

But how can you demand that a principal dealing with everything, from premises to school transports and a million other things, should also decide what search engine to use in a database? We have to get to the point where we have an advanced, competent support function. (Paul)

Several school leaders also see the importance of being a role model or setting the direction through their own practice: “You have to be a good role model with good examples, and use the same types of tools when you communicate with your staff, so that you keep up with the digital development” (Rob).

For the school leaders, another important aspect of PD is the need to provide good conditions for teachers in the process of digitalization. Teachers need to deepen their competency in order to develop new forms of teaching and learning that comprise digitalization. One school leader commented on digital competency and the “courage” (SL19) to use digital tools for his/her own use and in turn for teacher’ use. According to the school



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leaders, teachers need support to “see the advantages and adapt their work methods” (SL26). Further, some school leaders mean that digitalization cannot be a choice for actors in school: “digitalization is not a choice in my school, it is a requirement” (Paul).

There are also school leaders who argue, in both the learning reflections and interviews, for the importance of supporting students when digitalizing school. One school leader notes: “We can’t expect all students to know this [to be digitally competent]” (Mary). Another school leader describes how students receive support in the form of study hacks, where students can book meetings with educational technologists. Here, students receive help in finding suitable presentation tools or programs or “other things that they need help with or tips on” (Mary). This also means that students, by means of what they learn in the study hacks, can contribute with ideas on how digitalization can develop learning processes in the classroom.

### *Developing the organization*

In this category, developing the organization, three subthemes were seen: accessibility, new technology for administration and communication, and new forms and structures for sharing.

Accessibility to technology is thought to be as important for developing the organization: “Computers and other ICT-tools are a necessary tool for teachers and students” (SL3). Here, the school leaders mean that accessibility is important for compensation: “It is important to compensate for children and families” (SL31). Accessibility to technology is also found to be important from the perspective of equity. According to one school leader, this is construed as: “All teachers and students have the same basic foundation. Those who want to get a bit further must have the possibility to do so” (SL12). Access to technology is also thought to be essential for educational development: “Before, we had fewer computers and the teachers had to book them. In the end, the computers weren’t used and this meant that there wasn’t any development. Booking computers became an extra step and then they weren’t used” (Kate).

The administration of new technologies and communication are also seen as important conditions for developing the organization. New tools are necessary, i.e., “Tools to facilitate meetings, not necessarily physical meetings, and platforms for information and dialogue, joint Office 365 groups, and changes in textbooks” (SL2). Another school leader expresses this as the need for “infrastructure, e-mail, learning management systems” (SL13). Another school leader notes that “Digitalization can be used to minimize the administrative burden on all levels of the school organization” (Paul).

For teachers, school leaders and other staff members in the organization, forms and structures for sharing become important for future development. One school leader reports: “In larger school organizations, it becomes important to develop clear and transparent structures for sharing so that people know who to ask” (Jo). Methods for sharing are “web tools, best practice, and pedagogical cafés” (SL13). Other school leaders describe attempts: “we have tried to organize different forms of pedagogical cafés” (Robert). Other school leaders explain that they give teachers time: “In my school there is time allocated for collegial learning” (John).

### *Developing teaching and learning*

In this category, developing teaching and learning, two subthemes are seen: creating conditions for new forms of teaching and learning and collegial learning.

According to the school leaders, important aspects in developing teaching and learning through digitalization involve supporting teachers’ work, “giving teachers’ the conditions to [develop teaching] through equipment and knowledge, PD, for example online courses” (SL8). One school leader expresses this with the following: “The question is how much we should add in order to not just do the same thing but also ensure that it is thought through

and that it is an alternative. There is so much to develop. The technology is in place, but we need to work more on content” (Victor). The school leaders also see digital tools as a form of “extending/strengthening pedagogy” (SL21). Developing teaching and learning also involves supporting the development of teaching with a higher level of digitalization: “For example, (distance, flex-distance, remote) in order to be able to simplify work (communication, assignment and study materials) as well as take advantage of more possibilities (multimedia, images, film)” (SL19).

In supporting the development of teaching and learning, the school leaders provide examples of different methods for teachers teaching teachers. A central aspect here is “collegial learning” (SL2) as well as “leading teachers’ learning processes” (SL4). One example is described as: “We have a teacher who is competent in programming; she invited the other teachers and showed how to do it” (Victor). Several school leaders also point out the importance of building a culture which supports collegial learning: “Many issues can be solved through collegial learning, because there is so much [knowledge] accessible. [Creating conditions for collegial learning] is related to leadership, but it is also a question of culture” (Paul).

### Discussion and conclusion

In returning to the research questions, the first question was directed toward gaining insight into how school leaders understand what is meant by digitalization in their profession as school leaders. As school leaders set the direction for digitalization, it appears that the role of the school leader appears to become more complex (cf. Pettersson, 2018a, b). As noted by the school leaders in this study, there are many areas and levels at which the school leader has the responsibility to drive development and lead for digitalization. School leaders’ work in this area involves, for example, initiating, implementing, maintaining, documenting and leading for digitalization for themselves, teachers, parents and students as well as for the schools as organizations. Another interesting understanding is the accessibility to technology that according to these school leaders appears to be a strong but challenging condition for supporting the organization in its developmental work (cf. Dexter, 2008; Starkey *et al.*, 2017). This an interesting finding when considering the otherwise good accessibility to technology that has been reported in Sweden (National Agency for Education, 2013). This challenge could also appear to be of even more importance in schools and municipalities in which students do not have access to computers at home. Other important aspects involve support teachers’ and students’ development of new teaching and learning methods (Ottestad, 2013), providing more efficient administration and driving school development. In other words, there are a large number of complex tasks on several different levels (Pettersson, 2018a, b).

Digitalization on several organizational levels takes time (Freeman *et al.*, 2017; Grönlund, 2014; Håkansson Lindqvist, 2015b; Tallvid, 2015). Further, the work with digitalization is expected to contribute to a larger picture, i.e., school development. For these school leaders, digitalization, as a complex concept in itself, appears to increase the complexity of the school leader’s role in leading for digitalization (Dexter, 2008; Petersen, 2014). Setting the direction involves a comprehensive and diverse task and the need to prioritize in leading for digitalization among many other important tasks to deal with. As discussed by Schrum and Levin (2016), digitalization seems to take place in the midst of different and constant processes of change which must be taken on simultaneously. This, in turn, seems to contribute to a broad, comprehensive and complex understanding of what digitalization means for school leaders in their professions.

The second research question was directed toward gaining insight into what PD, according to the school leaders, seems to be needed to support the work in leading for digitalization. As illustrated in the first research question, the concept of digitalization is complex, which has impact on and requires an understanding of digitalization on several

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different levels (Mishra and Koehler, 2009; Avidov-Ungar and Shamir-Inbal, 2017). For school leaders, insight seems to be needed on all organizational levels, and includes insights on which digital competencies are needed for different stakeholders on different levels. That is, in relation to how digitalization is driven, as well as knowledge and competencies regarding which forms of developmental work are conducted, as well as the competencies and the PD which is needed, for example, in classroom work for students and teachers. Moreover, deeper knowledge regarding policy and steering documents and digital competencies in how these documents, as discussed by Petersen (2014) and Chua Reyes (2015), can be realized and implemented in practice is necessary. How the lead for digitalization affects these different levels also has impact on school development in a wider organizational perspective. Consequently, it could be assumed that school leaders' different competencies need to include an important interplay between these pedagogical, digital and wider organizational and leadership knowledges as previously discussed by, for example, Avidov-Ungar and Shamir-Inbal (2017).

Thus, PD in new areas, such as digital competencies needed to lead for digitalization, will most likely be necessary. However, in this study, few school leaders believe their own digital competencies as school leaders are necessary in leading for digitalization. Many of the school leaders note the importance of their PD, which entails an increased understanding of the steering documents and thereafter discuss teachers' and students' PD and digital competencies. However, based in the results in first research question a serious concern for school leaders seems to be to deal with aspects of their own PD in the task of combining their own competencies and leading others in the digitalization process (Leithwood and Riehl, 2005; Leithwood and Jantzi, 2006). An interesting finding in this study, related to PD, is that collegial learning is found on all levels. As noted by several school leaders, collegial learning and collaborative discussions with other school leaders are important and present methods of creating opportunities for learning how to lead for digitalization. On the one hand, this might be the result of the difficulty of knowing if and what digital competencies are needed, and therefore the issue of PD is delegated to a collegium of school leaders to discuss and investigate. While collegial learning will most likely be helpful in advancing digital competencies, more systematic forms of PD will most likely also be necessary (cf. Håkansson Lindqvist, 2015a, b; Pettersson, 2018a, b; Grönlund, 2014; Schiller, 2003).

As shown in this study, the need to develop teachers' and students' digital competency, as well as teachers' PD, is reported by the school leaders in this study. Creating supportive conditions for all students to be able to meet the challenges of today's information society is noted as well as the ability to take on a critical stance. Creating supportive conditions for teaching and seeing the advantages of digitalization in the classroom by means of digital competencies are also put forward for teachers, as well as achieving the knowledge requirements in the steering documents. The same can be said developing teachers' professional stance toward digitalization. For a school leader, understanding and supporting teachers' digital competencies and work with digitalization appears to be a strong base for supporting student outcomes (Dexter, 2008). However, the ability to support teachers' work demands school leaders' insight into teachers' work with digitalization and the effects of this work in practice. Therefore, there is a need for school leaders' PD (Grönlund, 2014; Håkansson Lindqvist, 2015b; Pettersson, 2018a, b).

The results of this study show that school leaders see digitalization as a wide and complex concept that can be related to student outcomes, digitalization in curriculum and course plans, and the responsibility for the digitalization of teachers' and students' work in the classroom. This also calls for digital competencies that include both digital, pedagogical, organizational and leadership competencies (cf. Avidov-Ungar and Shamir-Inbal, 2017). The need for PD comprises their own PD, but also teachers' PD, students' digital

competency and the digitalization of schools as organizations. Conclusions can be drawn that the role of the school leader is strong in setting the direction through supporting students' and teachers' work with digitalization for teaching and learning. The role of the school leader is also important in involving teachers and students, but there may also be the need to involve parents as stakeholders in this process. How school leaders prioritize and lead for digitalization and support their organizations in this work, i.e., leading for digitalization, will be of importance for schools' development.

Another aspect worth noting is that the PD program in Sweden, leading for digitalization, is voluntary, i.e., based on interest, time and opportunity to complete this program. This leads to questions regarding which school leaders choose to participate, which in turn restricts these new competencies to certain school leaders in certain schools and municipalities. This is especially interesting, as expressed by one of the school leaders in this study, who sees digitalization as a requirement. This issue then becomes an issue of digital equity and of gaining adequate digital competency in line with, for example, the Swedish National IT strategy (The Committee for Digitalization, 2014) and national digitalization strategy for schools (Swedish Government, 2017). A school leader is expected to have sufficient digital competency to lead, support staff in the digital developmental work and be responsible for ordering technical equipment (Swedish Government, 2017). This means that digital competencies, in relation to all levels in general are needed for school leaders as well as for specific knowledge for support students and teachers.

#### *Implications for practice and future research*

Regarding implications for practice, how time, resources and PD are made available to support school leaders in their work with leadership for digitalization will be important. This also concerns the prioritization of digitalization as one of many important areas in schools as organizations. Considering the complexity of school leaders' leadership, future research could involve a deeper study of what PD could be of interest for school leaders in their leadership for digitalization. Further, more research to analyze which specific competencies, knowledge's and subject content are needed. This research should also take on and continue to study the complexities of leading for digital competencies for school leaders. Moreover, a critical viewpoint on how school leadership is affected by, and can be employed in, the ongoing process of digitalization in schools will be important to study. It could be helpful to explore the work of other countries in terms of digital competencies and PD for school leaders. This paper establishes a need for a PD Framework. Here, a next logical step would be to conduct an in-depth literature review of what has been achieved elsewhere, including digital competencies required of school leaders.

#### *Limitations of the study*

The number of school leaders included in this study is small and this is a limitation. The sample size could, on the one hand, make this a pilot study. On the other hand, this study may be seen as a pilot study in a relatively unexplored area with the aim of creating a broad and initial picture of school leaders' understanding of digitalization and the PD needed for leading such process; in other words, providing a foundation for future work.

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