

Networking between school organizers - supporting the advanced use of digital technologies in the educational system

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Abstract

This paper aims to describe and analyse how school organizers network to expand the access and use of digital technologies in the educational system. The digitalization of the educational system requires digital competence since digital technologies develop fast. It involves a holistic view and a lifelong learning perspective. Change processes that digitalization brings make school organizers network and share challenges and successes. The data have been collected in the framework of a project between three municipalities. Thematic analysis and practice architecture have been used to categorize and analyse the data. When school organizers describe and analyse the network to expand digital technologies in the educational system, they talk about the importance of learning from each other and spreading knowledge, keeping updated with new digital technologies, thinking from a holistic perspective, and communicating digitalization plans. They also discuss the importance of support and collaboration between technology administration and schools.

Keywords

Digital competence, digital technologies, educational system, network, school organizers.

Introduction

This paper is about networking between school organizers to implement digital technologies in the educational system. The concept of networked learning includes interactions between people, technologies as artefacts, and collaboration enabling a shared culture. It can be defined as "processes of collaborative, cooperative and collective inquiry, knowledge-creation and knowledgeable action, underpinned by trusting relationships, motivated by a sense of shared challenge and enabled by convivial technologies" (Networked Learning Editorial Collective, 2020).

Networks may be important in the context of education since education is vital as a motor in societies (Carvalho & Goodyear, 2018). The researchers explain that "education can be broadly considered to include formal and informal learning, and life-long as well as life-wide learning" (p. 28). In this paper, education in the educational system refers to formal learning in pre-schools, compulsory schools, and upper secondary schools. In the last years, digital technologies have spread in the educational system, affecting teaching and students' results. Expanding the access and use of digital technologies creates changes requiring management. According to Littlejohn et al. (2019), changes' challenges may need specialist knowledge. It leads to consequences for organizations, as "professionals become more specialized" and "individual specialists need to collaborate together to solve problems" (p. 1).

In Sweden, three municipalities and Mid Sweden University participated in a network to implement the latest government's digitalization strategy. The network called Digitalization of the educational system in municipalities, abbreviated by the DUVKOM (in Sweden Digitalisering av UtbildningsVäsendet i KOMmunerna), was a project initiated by the university and municipalities aimed to study the change process to expand access and use of digital technologies in the educational system. In this network, the school organizers' representatives exchange knowledge and experiences about organizing digital technologies and digital competence in their schools.

Background

The implementation of digital technologies in the educational system has increased worldwide. Digitalization is about changing working methods and processes to increase teaching quality in schools. Organizing digital technologies in the educational system entails challenges that require infrastructures, and there is the need for organizational knowledge (Somekh, 2008). Ottestad (2008) means that organizational knowledge and digital technologies in schools are interconnected at different levels in the educational system, and it requires dialog between individuals and groups that share the same interest. Vanderlinde and van Braak (2010) discuss schools' capacity to "foster effective change through digital technology" (p. 542) and point out the importance of support. It is a question of managing the change that enables educators to support students in their knowledge development and, in this way, to increase results in schools (Agéllí Genlott, 2020). According to Bottino (2020), the problem is the quality of using and integrating digital technologies in teaching. The researcher means that it is not just an issue of digital technologies being used but also how digital technologies are used in teaching practice. Pettersson (2021) points out that digitalization processes are "limited to implementation of digital technologies without pedagogical and organizational change" (p. 187). Agéllí Genlott (2020) argues that digital technologies are developed rapidly, and this leads to changes in teaching and learning, making a need for "well-grounded incentives for the use of digital technologies in daily practice, improved digital competencies, positive social systems and networks and a supportive organization promoting long-term improvement" (p. 17). Digital technologies in the educational system are connected to many reforms, which have become a political issue (Gu & Lindberg, 2021). At the same time, the researchers point out that schools are vital in societies, giving "everyone an equal education and achieving equality" (p. 224). A reason for school organizers and school leaders to understand what digitalization of the educational system means, how it may develop and why it is important. The ability to organize and lead digital technologies strategy in schools requires digital competence, which seems to be "a key factor" (Håkansson Lindqvist & Pettersson, 2019, p. 219).

School organizers are responsible for working with the needs and prerequisites of schools, creating possibilities for school leaders and educators to expand the access and use of digital technologies in schools. In addition, school organizers can increase knowledge about implementing digital technologies in schools by co-operating with each other in a network. Littlejohn et al. (2019) stress that "to solve global challenges and generate innovative solutions, professionals have to expand their knowledge through continual learning aligned with work practice" (p. 3), which school organizers can do by sharing their knowledge and experiences with each other. However, how school organizers plan and execute the expansion and the use of digital technologies in schools from a municipality perspective requires both organization and digital competencies. The availability, accessibility, and quality of digital technologies influence how digital technologies are used in learning and teaching (OECD, 2018), affecting students' outcomes and inequality inside and between schools in a municipality (Bulman & Fairlie, 2016). School organizers need to understand how digital technologies influence people's lives and society. Organizing digital technologies in the educational system requires digital competence. There are two aspects to expanding the access and use of digital technologies in the educational system: the deployment of digital technologies "to improve and extend education and training" (European Commission, 2020, p. 2) and digital competence as a citizen in society. Gu and Lindberg (2021) point out that the latest Swedish digitalization strategy aims to increase the importance of using digital technologies to gain knowledge and achieve equality. However, new digital technologies are fast, digital competence may be seen as a condition for lifelong learning. Jaldemark (2021) describes lifelong learning as "a boundless holistic phenomenon" (p. 29) of learning processes in people's private and public life.

Digital technologies in schools demand or challenge the educational system (Salavati, 2016). It requires understanding how to expand the access and use of digital technologies, how digital competence can be organized in the educational system, how they may be used, and their effects on learning and teaching. Studying networks between school organizers may lead to a model for implementing digital technologies in the educational system and contribute to knowledge transfer between municipalities, enabling the expansion of digital technologies in schools.

Aim and research question

This paper aims to describe and analyse how school organizers network to expand the access and use of digital technologies in the educational system.

RQ1: How do school organizers network to expand the access and use of digital technologies in schools?

RQ2: What enables and limits school organizers' networked expansion of the access and use of digital technologies in schools?

Method

In this study, the data were collected in the framework of the project DUVKOM, a co-operation project between Mid Sweden University and three municipalities in Sweden. School organizers' representatives for these municipalities participated in eight meetings, about three hours each meeting, during November 2018 and September 2021. The central theme for the meetings was the implementation of digital technologies in schools. A host municipality received the others in the project for each meeting and presented its digitalization work in detail. The structure of the meetings was as follows: (1) an introduction and a presentation of the participants, (2) the host municipality presented a development work connected to their digitalization work, (3) the doctoral students' current research status, and presentation of new research connected to digitalization in education, (4) the three municipalities' status and experiences regarding digitalization in schools, (5) other issues, and next meeting. Four meetings were conducted via video conferencing service Zoom due to the pandemic. This paper defines the three municipalities as AM, BM, and CM. The meetings involved school organizers' representatives for the municipalities, plus three doctoral students and an associate professor representative for the university. The doctoral students' participation in the meetings consisted of reporting the status of their research and questions to the school organizers' representatives. The questions were sent to the school organizers' representative one week before the meeting. The number of representatives for each municipality varied between meetings. For each meeting, between eight to twelve individuals have participated. Sometimes a municipality had one representative in a meeting and three representatives at the next meeting. In total, 291 pages of transcriptions, meeting protocols, and notes have been analysed.

Thematic analysis (Braun & Clarke, 2020) has been used in this paper to categorize the data. Three predefined categories have been used: Network as a platform, Digital competence for everyone, and Equal access and use of digital technologies. The data have been coded, sorted, and classified from what school organizers say about the network as a platform to share knowledge and experiences, how they work to increase digital competence in the chain of command, and how they work to expand the access and use of digital technologies in schools. According to Braun and Clarke (2020), thematic analysis "can be undertaken with quite different guiding theories" (p. 331). The practice architecture (Kemmis et al., 2014) has been used to analyse the school organizers' work to expand the access and use of digital technologies in the educational system based on what they say in the network's meetings. Mahon, Francisco, and Kemmis (2016) mean that the language used in a practice's cultural-discursive arrangement enables and constrains what people think, say, and mean in semantic space. Therefore, the theory places school organizers' sayings in focus.

Findings

The findings presented below show how the school organizers network and what enables and limits this network to expand the access and use of digital technologies in schools. The first research question is: How do school organizers network to expand the access and use of digital technologies in schools? The following text presents important keys that school organizers have identified.

Learning from each other

The municipalities were active in the network by presenting their digitalization work and sharing their knowledge, experiences, methods, and examples. In an AM presentation, the school organizer presented two different perspectives to work with the implementation of digital technologies. One perspective was connected to the school organizer's quality work "the strategic level, i.e., the school organizer level, how we try to reason and think about digitalization" (AM, 7 December 2020). The other perspective was on the school level, "it is more about what may be found at the activity or unit level" (AM, 7 December 2020). The municipalities also shared models that they used in their quality work. Sharing culture was one key for digitalization work between and in municipalities, "we have received tips and ideas from other municipalities, and taken advantage of what we have identified as success factors" (CM, 3 September 2021). Therefore, a network with a sharing culture may be an important part of a municipality's digitalization work. CM meant that "it is easy to become home blind, so these types of networks, where we can spread good ideas and maybe twist the things that can work for us, are good" (7 December 2020). The network was also a way to learn from each other and keep updated with

new digital technologies, methods, and models for implementing digital technologies in the educational system, which is important since the development of digital technologies goes fast.

Holistic perspective

The school organizers discussed the importance of a holistic perspective connected to digital competence. Not only for educators "but also for school leaders and those who lead the digitalization" (CM, 28 April 2021). AM also talked about the importance of the holistic perspective, "in practice, we need to see that all our schools, with different needs and conditions, are part of the whole school activity" (AM, 7 December 2020). At the same time, AM pointed out that it was difficult to set aside time for digital competence, which affected the holistic perspective that school organizers and school leaders needed to digitalize the educational system. The school organizers pointed out that even if there was a lack of time and engagement in digital technologies' issues, there was a need to "compensate for your shortcomings" (AM, 7 December 2020) and to realize "the need to understand your shortcomings of knowledge and competence" (AM, 7 December 2020). Furthermore, a holistic perspective gave "equality information" (CM, 28 April 2021), increasing possibilities for equality in municipalities. With a holistic perspective, the school organizers made visible every activity's needs and conditions, thereby "a focus on who we exist for" (AM, 7 December 2020).

Leadership

Implementing digital technologies in schools requires leadership since school organizers may understand the digitalization process differently, and it may influence the understanding of how it changes working methods. Furthermore, the digitalization process required leadership since "leadership that does not really have all the understanding of the parts that digital technologies bring influences the equality that school organizers hope for" (BM, 17 February 2021). BM meant that a school organizer without an understanding of the possibilities of digitalization may lead to equality not being achieved. It was also important with "a common view on how the digitalization work should be conducted" (AM, 7 December 2020), which was a leadership issue.

Concepts

AM pointed out the importance of "having a common language" (25 October 2019), which the municipality estimated has increased with the help of educational initiatives. Even having a consensus of concepts was important. Using a concept in different understanding may influence how a system uses or how educators formulate students' needs, prerequisites, and progress. Conversely, not having a consensus of concepts may affect students in different ways, even when students move from one municipality to another. AM (17 February 2021) pointed out that "it is important to have a consensus of the concepts because it makes big differences in how the system is used." For example, to have the same understanding of a concept was about digital competence and digital technologies.

Digital competence

Digital competence was needed throughout the chain of command. However, digital competence should be adapted to the target group. To CM, digital competence for school organizers was "understanding for what digital technology is, and how school leaders and educators experience digital technologies" (3 September 2021). CM meant that digital competence should be adapted to the profession, leading to different digital competence needs. AM agreed with CM and meant that digital competence is "to understand others' opportunities and needs" (3 September 2021). At the same time, CM pointed out that it is an issue of understanding how it would be for others and understanding the possibilities digital technologies may lead in teaching, "it needs to be more precise and understand a certain type of digital technologies to see opportunities" (3 September 2021). AM wanted to create and increase equality between pre-schools and schools in terms of digital competence, access to digital technologies, and commitment to using digital technologies. They meant that educators also pushed for equality issues, both when it came to digital competence and access to digital technologies between schools. However, it may be inequality, "depending on the schools focus or what they buy-in and so on" (AM, 3 September 2021).

Digital technologies

AM (7 December 2020) mapped where their schools were in the digitalization work. It aimed to get a holistic view of what was happening in practice. BM meant that the access and use of digital technologies in schools were inequality since it was a school leader's issue in the municipality and not a school organizer's issue, making digitalization issues "end up to the side" (BM, 17 February 2021). CM (28 April 2021) stressed that they collaborated with technology administration in order to focus on the pedagogical perspective; schools should be able to decide on digital technologies depending on their conditions. CM also pointed out that school leaders' leadership influenced how digitalization technologies were implemented in schools. If the school leader

managed digitalization work as an important work and invested in it, then the school had come further than other schools. Regarding digital technologies in the classroom, CM pointed out that digital technologies should be easy to use in the classroom, and support was important. Expanding the access and use of digital technologies in the education system takes time; it does not happen from one day to another. The school organizer's digitalization work must not be complicated and must be communicated as easily as possible. The school organizers meant that digitalization is about "bringing a new dimension into the school," as a "different way of doing things" and "a tool for doing things in a different way" (CM, 28 April 2021).

Equality

Equality has been an important starting point in AM:s, BM:s, and CM:s digitalization work. Expanding of digital technologies in schools has been seen as an opportunity to increase equality in and between schools, "digitalization affects students' opportunities to express themselves and the opportunity to absorb knowledge in a way" (AM, 28 April 2021). AM also pointed out that "there is an equality problem, from digital competence and access to digital technologies in the schools, so we work towards a greater equality between the municipality's schools" (3 September 2020). According to BM, equality issues may be influenced by the school organizer's and school leader's leadership, thereby influencing "students' results" (BM, 17 February 2021). In CM, equality issues have been a basis for digitalization work. CM meant that there was no infrastructure to maintain a digital quality network, "it was swaying, there was no good support or routines for how digital technologies would be maintained" (28 April 2021), affecting school leaders' motivation to drive digitalization's issue. At the same time, CM pointed out that there was a risk for "things becoming too equality" (28 April 2021), meaning that there was a risk for digitalization work becoming centrally controlled and the schools' needs invisible. CM meant that equality is not the same as doing exactly the same thing, why a balance is important, "you have to go back and listen to the activities" (CM, 28 April 2021).

Table 1 presents a summary of these keys. The themes are in the first row, and the sub-themes are under the themes in the second row. The left column of table 1 relates to the first research question, RQ1.

Table 1: Themes and sub-themes for RQ1

| | <i>The network as a platform</i> | <i>Digital competence for everyone</i> | <i>Equal access and use of digital technologies</i> |
|---|--|--|---|
| School organizers network to expand the access and use of digital technologies in the educational system. | <ul style="list-style-type: none"> - A sharing culture - Learning from each other - Increase digital competence - A way to keep updated with methods and models - Spreading knowledge and good examples | <ul style="list-style-type: none"> - Holistic perspective by understanding the effect of digitalization in society - Digital competence influences leadership - Understanding of concepts affects equality - Digital competence to create prerequisites for teaching and learning. Understanding how other people became influenced by digital technologies. | <ul style="list-style-type: none"> - Holistic perspective - Learning from each other - Leadership influences how digital technologies have been implemented in schools - Understanding of concepts influences how digital technologies are used - Digital competence for understanding how to organize digital technologies in schools |

The second research question is: What enables and limits school organizers' networked expansion of the access and use of digital technologies in schools? As for the first research question, the following text answers the second question.

Enables

The network allowed openness between school organizers by having dialogues about success and failure regarding expanding the access and use of digital technologies in schools. Another key was sharing knowledge, experiences, and good examples with each other. The school organizers got tips and ideas that they could use in their digitalization work, "there are many examples to learn what has gone well and what has gone less well" (CM, 20 December 2020) in other municipalities. Regarding the discussion about what allowed expanding the access and use of digital technologies in schools, CM meant that it was important to listen to the needs of the schools and sometimes take a step back, to use a checklist for the lowest level as a way to increase educators' digital competence, what "everyone should know" (AM, 7 December 2020). One way to create equality in and

between schools was to find a minimum common denominator that raised with time and had mandatory elements for everyone and involved educators in the digitalization work. However, it was important to match digital competence to the group's or individual's needs. The digitalization work at the school organizers' level has been focused on "leadership" (AM, 15 Mars 2019) and "management and control" (BM, 15 Mars 2019), which is a prerequisite for the digitalization work. Clarity on what was expected made it easy for school leaders and educators to expand the access and use of digital technologies. However, it required a clear strategy with goal orientation.

Limits

Some limitations were found in the school organizers' network. For example, when a municipality's organization was changed, and the municipal school organizer's representatives were changed, then the project's continuity was influenced. When the school organizer's representatives did not have time to participate in the network and contribute with knowledge and experiences. Regarding the discussion about what allowed expanding the access and use of digital technologies in schools, AM meant that if the school leader did not have time to work with digitalization, then he needed to compensate and understand what needed to be compensated, "need to understand your shortcomings of knowledge and competence" (AM, 7 December 2020). Digital technologies would be easy to use in the classroom, and support was important. However, lack of support made educators avoid using digital technologies in teaching. Expanding the access and use of digital technologies in the education system takes time; it does not happen from one day to another. The collaboration between technology administration and schools can sometimes be challenging. A good relationship between school organizers and technology administration maybe lead to a focus on the pedagogical perspective.

Table 2 is connected to RQ2 and presents a summary of enablers and limitations.

Table 2: Themes and sub-themes for RQ2

| | <i>The network as a platform</i> | <i>Digital competence for everyone</i> | <i>Equal access and use of digital technologies</i> |
|---|--|--|---|
| School organizers network - enablers | <ul style="list-style-type: none"> - Openness between school organizers, - Share tips and ideas - Dialogue about success and failure regarding digitalization | <ul style="list-style-type: none"> - Open dialogue to understand the lack of digital competence - A minimum requirement - Be precise, kind digital competence | <ul style="list-style-type: none"> - Good relation - Good leadership - Listen to the schools - A gold thread in digitalization work - Clarity on what is expected - A good infrastructure - A holistic perspective |
| School organizers network - limitations | <ul style="list-style-type: none"> - Change in the municipality's representative - Lack of continuity in digitalization work - Lack of time | <ul style="list-style-type: none"> - Lack of time - Lack of resources - Individual attitude to digital technology | <ul style="list-style-type: none"> - Relation with the technology department - Lack of resources - When the technology is in focus for the implementation work - Lack of support |

Discussion

The reality for the three municipalities is different depending on the municipality's size, economy, and culture. However, networking with each other is a way to exchange and increase knowledge about how the municipalities should be able to implement digital technologies and digital competence in schools, avoiding some challenges and creating awareness of successful keys. The findings show that by sharing knowledge and experiences about digitalization work, the school organizers increase their digital competence, understanding what was worked, and different challenges that other municipalities have with expanding the access and use of digital technologies in their schools.

Implementing digital technologies in the educational system requires a culture change in schools. However, it does not mean that there will be an improvement in teaching and an increased quality in the school. Nor does it

have to mean that students' results increase. Many circumstances affect how digital technologies are used in schools, for example, educators' and school leaders' digital competence, number of computers and tablets in school, time given for development, Wifi, infrastructure, educators' and school leaders' attitude to digital technologies. Large municipalities have more opportunities for internal networks creating a collegial learning structure and elevating employees with cutting-edge expertise in the municipality. Continuing education in the form of collegial learning is something that research recommends. The three municipalities' network is a way for the school organizers to cooperate regarding expanding the access and use of digital technologies in the educational system, which according to Littlejohn et al. (2019), is important in work practice. When school organizers discuss the importance of leadership, they point out how it influences schools' possibilities to expand the access and use of digital technologies in the educational system. According to the school organizers, it is important to understand how digitalization affects society, which is a digital competence issue. Supporting schools (Vanderlinde & van Braak, 2010) requires leadership that enables prerequisites for digitalization work. Digital competencies are ongoing on school levels, and school organizers often do not have an overview of which interventions occur and where these interventions lead to. The lack of a holistic perspective makes it difficult to measure the effect of these efforts at the principal level, which would have been an excellent strategic tool for change and development of digitalization work. A lifelong learning perspective contributes to increasing the school organizers' holistic view on digitalization work. Digitalization is a social transformation that affects the way of living as human beings. It also affects the school's role in society, becomes a tool for society as a change force, and increases equality, according to Gu and Lindberg (2021).

There is openness around digitalization issues among the three municipalities. Both in the form of a willingness to share their experiences and a curiosity about how the other municipalities have done. The relationship between school organizers and technology administration has changed to a more relationship-oriented relationship in the last few years. For example, when digital technologies are applied in schools, then school organizers and technology administration discuss both the pedagogical and technological points of view. It is a prerequisite for digitalization work not to be without the pedagogical perspective (Pettersson, 2021).

The smaller the municipality, the easier the collaboration between the school organizers, school leaders, technology administration, and IT strategies, and the easier it is to organize the digitalization work. A key to the access and use of digital technologies in schools is how it is organized, which requires leadership and digital competence, according to Håkansson Lindqvist and Pettersson (2019). It is easier for the school organizer to point in one direction and involve staff in a small municipality. However, there is not the only way to digitalize schools. There is no right or wrong, there are different ways to proceed, and the school organizers need to choose a way to work with digitalization and adapt it to their organization. Why it is important to understand what digitalization of the educational system means, how it may change and why it is significant. It requires digital competence, which can be seen as lifelong learning, which Jaldemark (2021) means is a lifelong process.

The schools' needs and conditions govern how the school organizer needs to organize and structure the digitalization work in the municipality. It is important since it affects students' outcomes and equality in and between schools, according to Bulman and Fairlie (2016). It does not need to be wrong that a municipality has not made certain technological leaps. In some cases, this can lead to skipping certain digital technologies when new solution proposals emerge. However, digitalization is an ongoing change process that does not stop. The public discussion and new digital technologies' solutions increase the need for expanding the use of digital technologies in schools and preparing students for the digital society. The school organizers do not talk so much about digitalization issues linked to schools' work environment issues. One reason for the lack of discussion around this can be a view that school organizers see this as a school leader's issue. However, the school organizers' knowledge, skills, attitudes, strategies, values, and awareness may reflect how schools prioritize and conduct digitalization work. This will be important to support children, and young people need to learn to handle information flows and be critical.

Dialogue in the network enables knowledge transfer between school organizers, which is a key for co-operation. Dialogue between school organizers, school leaders, and educators also is a key for collaborating to expand digital technologies in schools, which Ottestad (2008) has lifted up. Digital technologies in teaching are also an issue of how to use them, which influences quality, according to Bottino (2020). However, school organizers', school leaders', and educators' attitudes to digital technologies affect how digital technologies are used in teaching.

The discussion above shows that networks between school organizers may contribute to various perspectives on digitalization work in the educational system. School organizers have similar challenges in implementing digital

technologies in schools. By co-operating (Networked Learning Editorial Collective, 2020), school organizers share with each other challenges and successful strategies for expanding the access and use of digital technologies in schools.

In summary, the school organizers network to expand the access and use of digital technologies in schools by learning from each other, having a holistic perspective, increasing knowledge on the subject, which influences their leadership, increasing knowledge about how to understand concepts influencing using of digital technologies, and equality in and between schools. However, there is a need for more research on networks between school organizers, especially based on these networks' challenges and opportunities. There is also a need for more research on networks' models for school organizers.

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