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Editorial - Recent trends in the digitalization of the Nordic K-12 schools

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Digitalization of K-12 schools

The past decade has seen an increased interest in the possibilities and difficulties involved with the digitalization of society (Selwyn & Facer, 2014). This has affected all areas of society, particularly education (Selwyn, 2011). The use of information technology (IT), information and communication technology (ICT), new technology, modern technology, and other ways of naming the trend is evident (Willermark, 2018), as are the different ways of formulating the societal aspect of its use in the knowledge society (Dede, 2010), the information society (Kelly Garett, 2006), the networked society (Castells, 2000), the digital society (Mossberger, Tolbert, & McNeal, 2008), and others. These aspects come together in different conceptualizations of the skills, competences, and other kinds of preparation that are needed for people to take part in these societies (Siddiq, Gochyyev, & Wilson, 2017) – such as 21st-century skills (van Laar, van Deursen, van Dijk, & de Haan, 2017), digital competence (Ferrari, 2012), digital literacy (Reedy & Goodfellow, 2012), and more. At a policy level in Norway, Sweden, and Finland, changes have been proposed during recent years (Olofsson, Lindberg, Hauge, & Fransson, 2015; Niemi, Multisilta, Lipponen, & Vivitsou, 2014). In Norway, digital competence has been present in the educational discourse since the early 2000s; in Sweden, Denmark, and Finland changes are currently taking place. The trends are there, but how do we make sense of them? Is there a difference in the way these trends play out on a national and local level? Are there transnational trends as well?

In October 2017, Lindberg and Olofsson hosted a symposium at the University of Umeå, Sweden, in which the issues above were focused upon and discussed. Scholars and researchers from the Nordic countries were brought together to present their views on what they saw as the most recent trends in the digitalization of the Nordic K-12 schools. From many theoretical perspectives, empirical contexts, and subject areas, the paper presentations highlighted both national differences and similarities. In order to have the Nordic perspective put in comparison with non-Nordic circumstances, two keynote presentations held

by colleagues from Belgium and Australia addressed the area of concern from both the continental part of Europe and from the Asia-Pacific region. Both of these provided important and critical insights into how the Nordic situation can be understood.

Research in the Nordic countries seems to be concerned with understanding the situation that schools are in when digitalization is ongoing. However, research is also concerned with how the different trends on a policy level are brought into schools as grounds for practice as well as with how policies are implemented in a more concrete way. As can be read from the papers included in this special issue, schools in the Nordic countries are struggling to make sense of digitalization, as are researchers. Digitalization is there, but what is it?

In total, 15 paper presentations were given during the Umeå seminar. This special issue consists of 10 papers that Lindberg and Olofsson selected. In total, 12 researchers from five countries contributed to the special issue. Below, a short introduction of each paper is provided.

The 10 papers in this special issue

The first paper in this special issue is the conceptual paper "Rethinking communication in virtual learning environments through the concept of Bildung" written by Charlotta Hilli. In this paper, Hilli departs from her previous writings about virtual learning environments (VLEs) in Finnish secondary schools and relates these to the continental tradition of Bildung. Using VLEs as examples of a new digital technology, Hilli discusses the transformative relationship between the self and culture, differently described in terms of Bildung. The paper adopts a techno-cultural educational perspective – which, according to Hilli, means that the digital world is an extension of the physical world and, as such, an extension of humanity. In the paper, communication is understood as a central theme in theories of Bildung; communication is the space, or interface, in which Bildung takes place. Hilli points out a need to rethink what communication means in education when it is mediated through digital technologies such as VLEs.

The second contribution to understand the Nordic schools, is the outside perspective of Tasmania and the Asia-Pacific context provided by Jennifer Masters. As an extension of her keynote speech at the symposium, her reflective position paper, "Trends in the digitalization of K-12 schools: The Australian perspective", sheds light on the common perception in Australia that children's rich access to digital technologies in schools has not made a difference in the quality of education in the country. However, the paper reveals that the Australian government have invested in a new curriculum regarding digital technologies and the provision of equipment and professional development for teachers to support this goal. Masters's paper is informed by a document analysis of relevant policy documents, websites, project reports, media releases, and research relating to the topic. In the paper, three examples of innovative educational-research projects in the use of digital technologies in schools are provided, but even so, Masters argues that properly resourced and funded projects are unusual in Australia, making it unlikely that new initiatives in this area will be implemented successfully. Masters describes this as a missed opportunity, as research outcomes can contribute to justify why "new literacies" are essential in a contemporary school curriculum in Australia.

Paper number three in this special issue, "Digitally competent school organizations – developing supportive organizational infrastructures" was written by Fanny Pettersson from Sweden. As signified in the title, this paper can be placed within the continuously growing field of research investigating the meaning and role of digital competence in K-12 schools. Pettersson describes that such research has mainly focused so far on the level of single actors (that

is, students, teachers, and school leaders) whereas research with a focus on school-level competencies when promoting digitalization and educational change is scarcer. With this backdrop, the aim of the paper is to explore how schools in Sweden structure their organizations, institutional infrastructures, and activities as conditions for digitalization. Data were collected through interviews with school leaders and educational technologists from five upper secondary schools with extensive experience in digitalization and remote teaching. The analytical framework used in the paper consists of three categories – setting the direction, developing people, and developing the organization – and two types of digitally competent school organizations, goal- and structure-oriented schools and culture-oriented schools, are identified. Pettersson concludes that the insights from the paper can serve as a point of departure for understanding the different ways in which schools can both organize themselves to become comprehensive, stable, and digitally competent organizations and understand important challenges related to this process.

The fourth paper comes from Norway. It was written by Fazilat Siddiq, and as the title "A comparison between digital competence in two Nordic countries' national curricula and an international framework: inspecting their readiness for 21st century education" suggests, it provides a comparison of how digital competence is present in different frameworks in Norway and Sweden. As its point of departure, the paper put forth that ICT today not only plays a significant role in economic, social, and educational reforms but also creates changes in teaching and learning environments. Moreover, digital competence has achieved increased attention and now is regarded as a crucial competence in 21st-century education. The study conducted by Siddiq investigates the objectives and competence aims in the digital competence curricula of compulsory education in Norway and Sweden and in the international framework of developing and understanding digital competence in Europe (DIGCOMP). The aim was to analyse the visions and main features of the Norwegian and Swedish national curricula and inspect the extent to which they align with the DIGCOMP framework. The paper shows that the underlying visions and objectives of the frameworks largely converge. However, large discrepancies between the national curricula and DIGCOMP regarding the structure, the content covered (e.g., competence aims), and the instructional aspects can be identified. In light of the findings, the paper ends with a discussion about the implications the paper might have for researchers, policy makers, and curriculum developers.

Returning to the Swedish context, paper five discusses the issues of power and control in the classrooms in which digital devices have been introduced. It is the first of two papers written in collaboration by Peter Bergström and Eva Mårell-Olsson and included in the special issue. In this paper, "Power and control in the one-to-one computing classroom: students' perspectives on teachers' didactical design", Bergström and Mårell-Olsson report on a research study with the aim of investigating students' perspectives on teachers' different didactical designs from lessons in the one-to-one computing classroom. Bergström and Mårell-Olsson focus on three clusters of didactical designs. Each cluster represents different interactions between teachers and students in the one-to-one computing classroom. Data were collected through interviews with student focus groups that included stimulated recall in which different photographs of teaching and learning situations were shown to the students. Using Bernstein's theoretical concepts of power and control, the analysis shows how teachers regulate students and how students can make decisions in their learning processes. The one-to-one computing classroom can be one component of the facilitation of students' learning processes concerning when and how to study.

Eva Mårell-Olsson and Peter Bergström's second paper "Digital transformation in Swedish schools – Principals' strategic leadership and organization of tablet-based one-to-one computing initiatives" is paper number six in the special issue.

This paper takes on a school leader's perspective as digital devices are introduced in K-12 schools. In a Swedish context, the authors report on a research study with the aim of producing additional knowledge about principals' strategic leadership and organization of schools within established tablet-based one-to-one computing initiatives. In more precise terms, the aim was to produce additional knowledge of how principals lead and guide one-to-one computing initiatives in K–12 education. The paper used a qualitative approach and the empirical data were collected through semi-structured interviews with seven principals in five municipalities in Sweden. The principals all worked at schools that had been using tablets for more than six months within a one-to-one computing initiative. The theoretical framework that informed the analysis is based on Leontiev's activity theory and the concepts of motives, goals, actions, and operationalizations. The findings show, for example, that the marketization of schools (e.g., the school-choice reform in Sweden) in combination with the annual presentation of national rankings has had an impact on the financial situations of schools because they receive a voucher for every attending pupil. Furthermore, the principals' strategic leadership concerning their intentions and applied strategies regarding how to lead and organize the digitalized school can be understood as attempts to meet the demands of the marketization and digitalization of Swedish schools.

Another paper from Finland, paper number seven, was written by Annika Wiklund-Engblom and was based on a study in which students were part of distance education. The paper, titled "Digital relational competence: Sensitivity and responsivity to needs of distance and co-located students", is framed in an attempt to include distance learning in upper secondary schools in the Swedish-speaking parts of Finland; this paper makes the argument that being relationally competent is an essential skill for teachers. According to Wiklund-Englund, two key factors for relational competence are teachers' sensitivity and responsivity to learners' needs. Data in this paper consist of nine semi-structured interviews intended to capture the experiences of teachers in Finnish upper secondary schools as they practise distance teaching and learning. The focus is on how the teachers describe their digital didactical designs for distance courses and how they perceive whether the designs support students' learning. Wiklund-Engblom stresses the importance of teachers' digital relational competencies with regard to their sensitivity and responsivity. That digital relational competence involves an empathic approach to learners' needs in the context of digital didactical design – or, put differently, the teachers' abilities to anticipate needs and be sensitive and responsive to learners' needs in the distance-learning situation

Paper number eight, "Digitally competent schools: teacher expectations when introducing digital competence in Finnish basic education", was written by Linda Manilla from Finland. From a teacher's perspective, this paper describes the situation and context in which programming is introduced in a school. The background for the paper can be found in the increased exposure to digital technology and the consequent need to understand how the digital world works. Furthermore, it can be read in the light of the fact that countries all over the world are renewing their school curricula in order to include digital competence and computer science. The aim of the paper is to research and provide insight into what Finnish Swedish-speaking teachers see as crucial aspects when implementing a new curricula that introduces digital competence as a transversal element. The data consist of a course assignment which asked teachers to describe their understanding of the concepts of a digitally competent school and of digitally competent personnel. Data were collected from teachers taking part in an online professional development course focusing on digital competence and programming, using the theoretical frameworks of schools as learning organizations and Technological Pedagogical Content Knowledge (TPACK). In total, 86 teachers' descriptions were analysed in order to identify and present a list of 11 prerequisites that can be helpful to school leaders in the process of integrating digital competence in their schools.

During his keynote speech at the symposium, Jo Tondeur presented and discussed a continental perspective on questions concerned with the digitalization of K-12 schools and the related educational practices. In "Enhancing future teachers' competencies for technology integration in education: turning theory into practice", paper number nine in the special issue, Tondeur focuses on one such practice – teacher education. In this conceptual paper, the aim is to provide an overview of what is described as effective strategies that support pre-service teachers in adequately integrating ICT in teaching and learning activities. Anchored in the idea of enhancing future teachers' TPACK, the focus is on strategies included in the synthesis of qualitative evidence (SQD) model, which involves the following: 1) using teacher educators as role models, 2) reflecting on the role of technology in education, 3) learning how to use technology by design, 4) collaborating with peers, 5) scaffolding authentic technology experiences, and 6) providing continuous feedback. The paper describes how one can use the SQD model in practice by adopting the approach of teacher design teams. Tondeur describes a teacher design team as a group of two or more (pre-service) teachers who design (ICT-rich) curriculum materials. Based on the SQD model (i.e., theory) and the implementation of the key themes emerging from this model via teacher design teams (i.e., practice), this conceptual paper provides recommendations for improving the potential of pre-service training to enhance future teachers' use of ICT in their educational practices.

The last paper in the special issue is named "Adequate digital competence – a close reading of the new national strategy for digitalization of the schools in Sweden". This paper written by Göran Fransson, J Ola Lindberg, and Anders D. Olofsson is based on a close reading of the new strategy for the digitalization of Swedish schools. After providing a rich description of Swedish policies and decisions in the area of ICT between the years of 1983 and 2017, the paper specifically focuses the notion of "adequate digital competence" as it is used in the 2017 "Swedish strategy for digitalization of the school system". Based on the reading of the strategy, the authors formulate three dimensions for discussion: time, context, and interpretation. In the paper, the authors argue that these dimensions open a more general discussion about the content of policies regarding digital competence. Moreover, the notion of striving for an "adequate digital competence" for children, students, teachers, school leaders, and other school staff is loaded with a variety of possible meanings. The authors conclude that the strategy provides guidance in some aspects but leaves a lot to the local enactment of the strategy.

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