A glimpse of a Nordic model? Policy and practice in the digitalisation of the K-12 school and teacher education in Denmark, Finland, Norway and Sweden: Editorial introduction

The research symposium Teaching and Teacher Education in the Light of the Digitalised K-12 school – a Nordic Perspective, held in October 2019 at Umeå University, Sweden, was the third in a series of symposiums organised by the authors of this editorial to address broad-term challenges and possibilities concerning the digitalisation in K-12 schools and in teacher education. The included papers in this special issue of the Education Inquiry originate from this symposium. The first symposium, International Symposium on Informed Design of Educational Technologies – Enhanced Learning and Teaching, took place in October 2012 (Olofsson & Lindberg, 2012). The second symposium in October 2017 had a specific focus on Recent Trends in the Digitalisation of Nordic K-12 schools (Lindberg & Olofsson, 2018). While working on the special issue, a fourth symposium held in November 2020 specifically concerned Swedish and Norwegian Teacher Education in a Time of a Digital Transformation of Society.

As the four abovementioned symposiums indicate, in a Nordic context, the question of digital technology in teaching and teacher education per se is not new, neither is it new in research (e.g. Caeli & Bundsgaard, 2019; Gudmundsdottir & Hatlevik, 2018; Ilomäki, Paavola, Lakkala, & Kantosalo, 2016; Olofsson, Lindberg, Hauge, & Fransson, 2015) or educational practice and policy (e.g. in Denmark, Strategy for Denmark’s Digital Growth, 2018; in Finland, The National Core Curriculum for Upper Secondary Education, 2019; in Norway, Digitalisation strategy for primary and lower secondary schools, 2017; and in Sweden, #skolDigiplan, 2019). Interestingly, the literature indicates that educational policies often emphasise the potential of digital technology to reform or even transform teaching, learning and assessment, but research reports that digital technology has not yet had the positive impact expected from policy (see Hammond, 2014; Vrasidas, 2015; Wastiau et al., 2013). With that in mind, we wanted the 2019 symposium to be an event aimed at identifying and exploring signs of a so-called Nordic model of building digital competence and improving digital technology use in the contexts of K-12 school and teacher education. The event was to support joint academic efforts to investigate what the Nordic countries potentially have in common and how we together can improve and develop various issues in theory, as well as policy and practice, concerning digital competence and the uptake and use of digital technology in teaching and teacher education.

Former research in this field of interest indicates that elucidating such a thing as a Nordic model or a specific educational dimension to unite the Nordic countries is a rather challenging endeavour (cf. Blossing, Imsen, & Moos, 2014; Imsen, Blossing, &
Moos, 2017; Ottestad, 2010). Acknowledging this challenge, for 3 days, 18 invited researchers and knowledge domain experts from Denmark, Finland, Norway and Sweden gave keynotes and presentations exploring movements in the current national educational policy related to digital competence and the use of digital technology in the K-12 school and teacher education context. Approximately 50 additional senior and junior researchers, teacher educators and various representatives from the K-12 school took part in the discussions after each presentation, as well as in the final panel discussion. As previously mentioned, although rather briefly, some of the empirical examples presented and theoretical insights drawn at the symposium make up the backbone of this special issue of the Education Inquiry. This special issue is one of the outcomes from the year 2019 symposium, and our ambition is that it will help to disseminate the symposium information far outside Umeå University’s walls. We encourage the readers to contact us when additional questions arise, the texts spurn comments, or if ideas of future Nordic research collaboration in the area of digital competence and digital technology in the K-12 school and/or teacher education context come to mind.

We planned the next section in this editorial introduction to briefly describe the five papers included in this special issue. Nevertheless, for obvious reasons, inevitably we must first write a few words about the time shortly after the symposium in October 2019. In fact, the timing made our symposium more urgent than we ever could have thought – the time of the Covid-19 pandemic. At the beginning of 2020 and in a very short period, this impossible to foresee event radically changed the conditions for education not only in the Nordic countries but also all over the world (Ferdig & Pytash, 2021). The pandemic responses, with calls for social distancing, forced schools and universities to leave physical classrooms empty and hold classes online in what have been coined emergency remote-teaching practices. K-12 schools and higher education institutions had to rely heavily on digital technology to mediate teaching, learning and assessment (Bergdahl & Nouri, 2020), as well as uphold contact with the parents and secure the students’ physical well-being when unable to meet in the school daily (cf. Crompton, Burke, Jordan, & Wilson, 2021). Other issues discussed during the symposium in which, suddenly, various Nordic educational practices were tested included teachers’ profession-based (or professional) digital competence (PDC; Stenman & Pettersson, 2020) and the levels of institutional technical and pedagogical support (Giovannella, Passarelli, & Donatella, 2020). As of the writing for this editorial, the Covid-19 pandemic is still not over, and a substantial body of research is needed before one can draw any informed conclusions of how K-12 schools and higher education institutions in the Nordic countries managed to carry out and secure a high-quality education onward from the beginning of 2020. As this special issue implies, the policy documents for an advanced use of digital technology in teaching and learning were already in place in Denmark, Finland, Norway and Sweden. However, could policy be turned into practice? Another relevant research question that follows with the pandemic, is if teacher education in the Nordic countries had prepared the new teachers well enough to be able to work in this highly digitalised and crisis-prompted educational practice? Most likely, there are many other equally important questions that can be raised in this aspect. However, doing so is outside the scope and limitations of this editorial, and with that said, we now turn to the five included papers in this special issue.
concerning teaching and teacher education in light of the digitalised K-12 school in the Nordic countries. Below, each paper is briefly introduced. The editorial introduction ends with a few words on whether we can say, through these contributions, that we have provided a glimpse of a so-called Nordic model.

The first paper by Olofsson, Lindberg, Young Pedersen, Arstorp, Dalsgaard, Einum, Caviglia, Ilomäki, Veermans, Häkkinen, and Willermark, *Digital competence across boundaries – beyond a common Nordic model of the digitalisation of K-12 schools?*, discusses how digital competence can trace signs of how intentions at a transnational policy level are translated, negotiated and inscribed into Nordic national policy on education. Anchored in a few key transnational policies on digital competence, it describes some of the current Nordic movements in the national policies of Denmark, Finland, Norway and Sweden. The concept of boundary objects (Star & Griesemer, 1989) is used as an analytical lens for understanding digital competence as a plastic and temporal concept when discussing the concept’s multidimensional translation in these four countries. The authors conclude, for example, that there seems to be synchronous policy discourse around the development of digital competences at transnational and Nordic national levels. Moreover, a shared idea of digital competence’s importance in the national K–12 education system appeared to unite policy in the four countries.

The issue of educational policy on digital competence and the digitalisation of the K-12 school is also a focus in Gustafsson’s paper, *Taking a step back for a leap forward – policy formation for the digitalising of schools from the views of Swedish national policymakers*. With the research noting a gap between views among policymakers and practitioners, which gave rise to complexity in translating policy into action, the aim of this interview study is to explore the views among an exclusive group of non-traditional national school policymakers in Sweden, who were appointed to produce a national plan of action for the digitalisation of the K-12 school, the so-called #skolDigiplan (Swedish Association of Local Authorities and Regions [SALAR], 2019). Based on the empirical findings, Gustafsson concludes that national policymaking regarding the digitalisation of schools may be conducted through a collective process, with several educational stakeholders contributing. Moreover, non-traditional national policymakers, arguing a lack of digital competence knowledge concerning schools at the governing or authority level, may consider taking a step back in the policy formation process as a supportive action.

The third paper in this special issue, *Sociomaterial entanglement in one-to-one computing classrooms: Exploring patterns of relations and teachers’ practice* is co-authored by researchers from Denmark, Sweden and Finland. Through the paper by Meyer, Bergström and Wiklund-Engblom, the reader leaves the policy-level focus of the two initial papers and instead steps into the one-to-one computing classrooms located in each of these three Nordic countries. By starting with a comprehensive description of prior research studies on one-to-one computing classrooms, the aim of this empirical study is to broaden the discussion about emergent teaching practices in Nordic classrooms, in which students use tablets as personal devices. The authors provide three vignettes from ethnographic classroom studies in Sweden, Finland and Denmark that illustrate how tablets were used. In the analyses, the authors use a sociomaterial perspective and, specifically, the concept of patterns of relations, through which they
describe the dynamic entanglements of the emergent teaching and learning practices. Three patterns of relations are identified: (1) interrogation, (2) space-making and (3) materialisation. This study teaches two lessons, among others. First, tablets do not enter empty learning spaces but are woven into and participate in forming teaching methods in one-to-one classrooms. Secondly, teachers must learn to engage with and manage complex relationships, rather than learn how to use a tablet.

The final two papers included in this special issue concern the question of digital competence and digital technology within teacher education (in Denmark and Norway, paper 4; and in Sweden, paper 5). In the fourth paper, 25+ years of ICT policy in teacher education in Norway and Denmark – a study of how digital technology is referred to in policy documents, Arstorp applies a historical perspective when examining the role of digital technology in national guidelines and regulations in Norwegian and Danish teacher education over the course of 28 years (1992–2020). The study categorises the sentences mentioning technology into three categories based on Wartofsky’s work on artefacts: tool artefacts, teacher professional artefacts and discursive artefacts. Arstorp reports that the Norwegian policy documents show an increase in teacher professional artefacts and a decrease in tool artefacts over time, whereas the Danish policy documents show the opposite tendency. In addition, while discursive artefacts are absent in Danish policy documents, their presence diminishes over time in the Norwegian policy documents. Among others, one conclusion is the need for critical thinking and an understanding of how technology makes sense in a teacher’s professional pedagogical work, which is not addressed in the Norwegian and Danish national teacher education policy documents included in the study.

In the fifth and final paper, Conditions for professional digital competence: The teacher educators’ view emanating from the symposium Teaching and Teacher Education in the Light of the Digitalised K-12 school – a Nordic Perspective Lindfors, Pettersson and Olofsson explore how Swedish teacher educators view the individual, collegial and organisational conditions framing their dual didactical task. This study focuses on the duality of using digital technology in a way that ensures student teachers graduate from teacher education with the PDC needed for their future work in a digitalised school. From the analysis of the semi-structured interview study with 13 teacher educators, working in and, thereby, representing 21 mandatory courses in educational science at one teacher education institution in Sweden, the authors conclude that teacher education policy may require a strong focus on digital technology and PDC. Moreover, continuous professional development activities should be easy to access for teacher educators in order for them to develop their PDC. A third conclusion is that leaders at the organisational level within this teacher education institution should acknowledge and place higher value on teacher educators’ work to digitalise educational practices.

As promised above, this editorial will end with a few words on whether we consider the included papers in this special issue provide a glimpse of a so-called Nordic model. Our answer is that this is probably the case. We have not found a specific educational dimension uniting the Nordic countries referred to by Ottestad (2010) and Blossing et al. (2014), but throughout the papers, a common Nordic focus on the question of digital competence and digital technology in the K-12 school and in teacher education is present. The focus in the research and theory, as well as in the
policy and practice, seems to include several similar challenges and possibilities found in all the Nordic countries. Our prediction is that the Covid-19 pandemic will serve as an unwanted catalyst for an increased effort in the work of enhancing teaching, learning and assessment in a digitalised K-12 school and within teacher education.

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**ORCID**

Anders D. Olofsson http://orcid.org/0000-0001-8409-0557  
J. Ola Lindberg http://orcid.org/0000-0002-0941-9364

**References**

Bergdahl, N., & Nouri, J. (2020). Covid.19 and crisis-prompted distance education in Sweden. Technology, Knowledge and Learning, 3(26), 443–459.

Blossing, U., Imsen, G., & Moos, L. (2014). The Nordic education model. Dordrecht: Springer Netherlands.

Caeli, E. N., & Bundsgaard, J. (2019). Datalogisk tænkning og teknologiforståelse i folkeskolen [Computational thinking and technological understanding in the K-10 school, a round-trip]. Tidsskriftet Læring Og Medier (LOM), 11(19), 1–30.

Crompton, H., Burke, D., Jordan, K., & Wilson, S. (2021). Support provided for K-12 teachers teaching remotely with technology during emergencies: A systematic review. Journal of Research on Technology in Education, 1–16. (EPUB, Ahead-of-print). doi:10.1080/15391523.2021.1899877

Ferdig, R. E., & Pytash, K. E. (Eds.). (2021). What teacher educators should have learned from 2020. Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/219088/

Finnish National Agency for Education. (2019). Lukion opetussuunnitelman perusteet 2019 [The national core curriculum for upper secondary education, 2019]. Helsinki. Retrieved from https://www.oph.fi/sites/default/files/documents/lukion_opetussuunnitelman_perusteet_2019.pdf

Giovannella, C., Passarelli, M., & Donatella, P. (2020). The effects of the Covid-19 pandemic on Italian learning ecosystems: The school teachers’ perspective at the steady state. Interaction Design and Architecture(s), 45, 264–268.

Gudmundsdottir, G. B., & Hatlevik, O. E. (2018). Newly qualified teachers’ professional digital competence: Implications for teacher education. European Journal of Teacher Education, 41(2), 214–231.

Hammond, M. (2014). Introducing ICT in schools in England: Rationale and consequences. British Journal of Educational Technology, 45(2), 191–201.

Ilomäki, L., Paavola, S., Lakkala, M., & Kantosalo, A. (2016). Digital competence – An emergent boundary concept for policy and educational research. Education and Information Technologies, 21(3), 655–679.

Imsen, G., Blossing, U., & Moos, L. (2017). Reshaping the Nordic education model in an era of efficiency: Changes in the comprehensive school project in Denmark, Norway, and Sweden since the millennium. Scandinavian Journal of Educational Research, 61(5), 568–583.
Lindberg, O. J., & Olofsson, A. D. (2018). Editorial - Recent trends in the digitalization of the Nordic K-12 schools. *International Journal of Media, Technology & Lifelong Learning, 14*(2), 103–108.

Minister for Industry, Business and Financial Affairs, Denmark. (2018). *Strategy for Denmark's digital growth.* Retrieved from https://eng.em.dk/media/10566/digital-growth-strategy-report_uk_web-2.pdf

Ministry of Education and Research, Norway. (2017). *Framtid, fornyelse og digitalisering - digitaliseringsstrategi for grunnopilleringen 2017–2021* [Future, renewal and digitalization. Digitalization strategy for primary and lower secondary schools 2017-2021]. Retrieved from https://www.regjeringen.no/contentassets/dc02a65c18a7464db394766247e5f5fc/kd_framtid_fornyelse_digitalisering_nettpdf

Olofsson, A. D., & Lindberg, J. O. (Eds.). (2012). *Informed design of educational technologies in higher education. Enhanced learning and teaching.* Hershey, PA: IGI Global.

Olofsson, A. D., Lindberg, J. O., Hauge, T.-R., & Fransson, G. (2015). Uptake and use of digital technologies in primary and secondary schools – A thematic review of research. *Nordic Journal of Digital Literacy, 10*, 103–121. [Special issue 2006–2016].

Ottestad, G. (2010). Innovative pedagogical practice with ICT in three Nordic countries–differences and similarities. *Journal of Computer Assisted Learning, 26*(6), 478–491.

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, “translations” and boundary objects: Amateurs and professionals in Berkeley’s Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science, 19*(3), 387–420.

Stenman, S., & Pettersson, F. (2020). Remote teaching for equal and inclusive education in rural areas? An analysis of teachers’ perspectives on remote teaching. *The International Journal of Information and Learning Technology, 37*(3), 87–98.

Swedish Association of Local Authorities and Regions (SALAR). (2019). #skolDigiplan. *Nationell handlingsplan för digitalisering av skolväsendet* [#skolDigiplan National plan of action for the digitalisation of the school]. Retrieved from https://issuu.com/sverigeskommunerochlandsting/docs/7585-773-2.2019

Vrasidas, C. (2015). The rhetoric of reform and teachers’ use of ICT. *British Journal of Educational Technology, 46*(2), 370–380.

Wastiau, P., Blamire, R., Kearney, C., Quittre, V., Van de Gaer, E., & Monseur, C. (2013). The use of ICT in education: A survey of schools in Europe. *European Journal of Education, 48*(1), 11–27.

Anders D. Olofsson

*Department of Applied Educational Science, Umeå University, Umeå, Sweden*  
✉ anders.d.olofsson@umu.se  
‡ http://orcid.org/0000-0001-8409-0557  
‡ http://orcid.org/0000-0001-8409-0557

J. Ola Lindberg

*Department of Education, Umeå University, Umeå, Sweden*  
‡ http://orcid.org/0000-0001-8409-0557