Chapter 11
Understanding Swedish Educational Policy Developments in the Field of Digital Education

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Abstract This chapter describes and analyzes Swedish educational policy related to technology and digital education over the past decades with a focus on how the relation between learning and information technology, as well as digitalization and its impact on other aspects of school development and management have been argued for and how it has been proposed to influence school practice. The analysis is based on a review of eight selected educational policy documents that relate to the framework of phases of Swedish educational reforms suggested by Sundberg. The result reveals that although there are some overlaps and recurring themes in the politics over time, connections between the rationale behind the political arguments and the reform timeframes are obvious. During its early years, digital education adopted a clear centralized and top-down strategy with extensive government investments without taking into account the local needs and conditions. Later, in line with decentralization and marketization of education, the performance turn, and the adoption of accountability as a governing model, more demands have been placed on local responsibility and self-regulating regarding digitalization in school. At the same time, research-based evidence and international comparison have been used as a basis to justify further development of digital education.

Keywords Digital education · Education reforms · Technology and learning · Digitalization in schools · Educational policy

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Introduction

Digitalization in schools is nothing new. It has taken place in various phases and to various extents over the past 40–60 years. Sweden has witnessed a long trajectory of the development of digitalization in the school system. Computers had already been introduced in Swedish schools in the 1970s (Ministry of Education, 2002; National Agency for Education, 2018). Development at that time was slow, and only a few schools were involved. In the 1980s, digitization in terms of computerization in schools was estimated to be about one billion Swedish crowns (about 95 million EUR. Ministry of Education, 2002). According to Jedeskog (2005), there were several waves of development during the 1980s. The first wave had the intention to introduce computers to the seventh to ninth grades of compulsory school, so as to teach students to be computer literate. The second wave in the late 1980s was intended to increase the general use of computers in schools. During that period, the focus on computers in schools mainly consisted of three levels: central development work to develop school-adapted software, regional development work to improve infrastructure, and experimental activities in selected schools (Ministry of Education, 2002).

National initiatives in the 1990s and beyond have carried out extensive investments in digital technology in schools. Compared to the rest of Europe, Sweden invested the most in information and communication technology in schools (Hamngren & Odhnoff, 2009). Since the late-1990s, the focus has shifted from the previous goals of equipping schools with computers and basic computer learning to technology-related competence development for teachers and to increase students' achievement of the curriculum's knowledge goals through computer use. The Internet revolution in the late-1990s had fundamentally changed the conditions for information technology (IT) in the school (Ministry of Education, 2002). The great wave of digitization in schools came when schools were able to offer each student a digital device (one-to-one) with stable Internet access during the 2000s (National Agency for Education, 2018). The National Agency for Education (2019) reported that, in principle, all pupils in the Swedish school now have access to their own computers. Since the beginning of the 2010s, learning platforms and digital networking have become increasingly important for schoolwork. A learning management system, which is a web-based learning environment for communication between teachers and students, has become ever more standard in teaching contexts. Learning management systems also have coordination effects e.g., students and guardians can access digital material and update the students' knowledge, goal fulfillment, and other developmental statuses through the learning management systems (National Agency for Education, 2018).

Although previous IT investments in the school have lacked systematic evaluations, regular evaluations have been carried out recently. Since 2008, every 3 years, the National Agency for Education (2009, 2013, 2016, 2019) has followed up on the development of access, use, and competence regarding digital technology and digital tools. In line with the development of digitalization, research has also increased on IT use in the school. However, research on digital transformation in education

has mainly focused on the integration of digital technology in classroom teaching and learning, as well as how the changing conditions duo to digitalization have affected educators' work and students' academic and social goal fulfilment. Some researchers have studied users' perceptions, attitudes, and competencies necessary for the use of digital tools and resources in formal and informal environments (e.g., Haglind, 2015; Holmberg, 2019; Tallvid, 2015; Willermark, 2018). More recently, research on learning with digital technologies from the perspectives of multimodality and social semiotics has increased, in which the study's object is to demonstrate and understand the functions of the semiotic modes in the meaning-making process (e.g., Bezemer & Kress, 2016; Kress & Selander, 2012; Ravelli & van Leeuwen, 2018).

However, studies on the development of digital education policy over the past decades have been scarce. Political decisions, together with the teacher's professional missions, are of crucial importance in structuring and restructuring the education system. Digital education should be seen as an integral part of education governance. Given this, in relation to the fact that digitalization is an expanding area of education policy that lies within the major political and economic changes in societies, it seems that digital education has tended to lead a fundamental transformation of public education systems. In this context, a closer and more critical analysis of the rationale regarding digital education and its consequences for school systems and practices will contribute to our understanding of how we relate digital education to the broader ideas that education should embody for the individual and society.

This chapter aims to describe and analyze Swedish educational policy related to technology and digital education over the past decades with a focus on how the relation between learning and IT, as well as digitalization and its impact on other aspects of school development and management, has been argued for and how it has been proposed to influence school practice. The leading questions are:

- What goals and strategies for commitment, initiative, and implementation of digital education are proposed and argued for in policies during the different periods?
- How has the role of digital technology in digital education been formulated, expressed, and motivated in the policy documents?
- How can digital education policy changes be understood in relation to various phases of Swedish educational reforms?

Frameworks

Digital education is an important part of the national education system and strategy. To study the evolution of digital education policy and its implementation, it should be incorporated into the major educational reforms since the late twentieth century and include an analysis of the circumstances in which these major educational reforms have taken place. To frame the analysis and outline a path of educational policy initiatives for digitization in Swedish education, the proposed phases of

Swedish educational reforms by Sundberg (Chap. 6, this volume), the periods of rational planning (1960–1990), educational restructuring (1990–2010), and performative accountability (2010–) are adapted and applied.

Rational Planning (1960–1990)

Education in modern Sweden is an important area closely linked to the Swedish welfare system, which was based on the strong economic growth after the Second World War. A prominent aspect of the Swedish welfare model has been the powerful state and the rational model for social governance. It was believed that social change would be achieved through political and administrative procedures. This model was based on a normative ideal of the rationalist perspective on decision-making that trusted in the ability of state actors' and agencies' comprehensive knowledge to make the best decisions. Tveit and Lundahl (2017) called this model a collaboracy mode of policy legitimation that enabled national politicians to set policy goals, and the government's investigative committees engaged experts and researchers to support decision making. During that period, major educational reforms were based on concepts of centralism, universality, and consensus (Lindblad & Lundahl, 1999).

Educational Restructuring (1990–2010)

Since the 1990s, this rationalist political model has ended. Local influence, the need for decentralization, and individual freedom of choice have increased, and the legitimacy of national administrative authorities has declined (SOU, 1990), which were characterized by a functional transformation from the implementation of political programs to dissemination of information, execution of contact programs, and evaluation (Lindvall & Rothstein, 2006). The Swedish educational landscape has changed radically. During the 1990s, the school was municipalized, and free choice of school and establishment of independent schools were allowed. The education system was restructured to be decentralized with more local variations as a result of the introduction of management by goals and governing by results (Carlgren, 1995). The new National Curriculum (LpO 94) opened up for local interpretation and variation. Much of what had been previously decided on a central level was now left to schools, teachers, and students to decide and negotiate. The policy is legitimated through a so-called agency mode (Tveit & Lundahl, 2017). In education, international agencies, such as the OECD and the European Union, are increasingly used by decision makers to provide synthesized comparative data that can be applied in national educational reform agendas under the condition of Europeanization or globalization (Dale & Robertson, 2009; Lawn & Grek, 2012). Changes also occurred in discourses, and terms such as equality of opportunity, equal standards, and a school for all children were gradually replaced by notions such as excellence, competition, free choice, and quality, as some of the results of the neoliberal ways of thinking (Carlgren, 2009).

Performance Accountability (2010–)

Along with the international trend of agency mode for policy legitimation, another strategy has been the development of quality assurance and evaluation (QAE) as an instrument for school governance within or across nation states. Decentralization and increased independence and autonomy at the local level have entailed intensified reciprocal accountability measurements at the national level. The underlying rationale for accountability is that producers are held accountable for the results they generate. In the educational context, accountability is largely related to students' performance. Governing is based on the results of schooling by means of students' performance on tests and other kinds of indicators as to how well schools are performing (Lindblad, 2018). Teachers and schools, which are entrusted with the necessary task of teaching and instruction, are the producers, whereas students' test results function as the measurable outcome (Rosenkvist, 2010). International large-scale assessments and statistical comparative data are usually referred to as scientific evidence in legitimating the national education policy (Ringarp & Waldow, 2016).

Data Selection and Analysis

In this study, national policy documents related to digital education were selected based on their relevance to the major investments and initiatives within the area of digital education in the Swedish education system as well as their impact on school practices through the given time frame. We obtained the documents from three main public sources: Swedish Government Official Reports (SOU), the Publications Series of the Ministry of Education, and Government Bills and Government Written Communications. Government Official Reports (SOU) are important in Swedish policy formation. These reports are carried out by a government-appointed committee or commission of inquiry to examine various alternatives in relation to specific issues. The government provides a set of guidelines for the commission's work in terms of reference, and it sets out what issue the commission is to examine, what problems must be solved, and by what date the inquiry should be completed. Reports often have a predetermined effect on the political decisions that are actually taken (Pettersson, 2013). Since 1968, the Ministry of Education has been responsible for the government's education and research policy that is usually based on investigations presented in reports. The government's vision and strategies regarding digital education efforts are also expressed in the government's written communication and in the bills where the planning and budget for various areas, including education for the coming years, are presented. A total of eight policy documents were selected for analysis (see Table 11.1).

There are various types of policy studies and strategies for policy analysis that rely on different approaches. One approach aims primarily to examine the causes and consequences of public policy. Such an approach tends to provide more

Table 11.1 Themes covered in the policy documents in this study

Time periods	Policy documents	Goals and strategies of digital education	Role and function of technology in digital education
1960–1990 Rational planning		Theme: Centralization and top-down initiative	Theme: Digitalization as a means for achieving equality and equivalence
	Government Bill: 1983/84:100. The Ministry of Education, 1983	Societal values such as gender equality and gaps between generations	Knowledge about technology and its use.
	Action program for computer education in school, adult education and teacher education. The Ministry of Education Publication Series 1986:10 (computer education group). 1986	The good computer society. Social values such as gender equality and rights for people with disabilities. Societal consequences for work, relations between humans, issues of power, integrity (supplement 10, page 10).	Computer support for pupils with special needs, to enhance learning. In teacher education as a support for teaching. Possibilities to be used and risks to be avoided. Computer technology as a tool for effective teaching with enhanced quality.
1990–2010 Educational restructuring		Theme: Decentralization and evidence-based practice	Theme: Digitalization as a tool for effective teaching and learning
	Wings for human ability. Government official report. 1994:118, 1994	IT as a tool for achieving individual and societal values as gender issues (girls and women and technology), and disabled, Communication, collaboration, information, develop new knowledge, problem-solving, being meeting, socializing.	IT to enhance life quality for all. IT as a force for internationalization and globalization.
	The learning tool – national program for IT in school. Government Communication 1997/98:178, 1998	Preparing for a changing working life and future education. Learning for the knowledge society. Lifelong learning.	IT as a tool for learning. IT as part of everyday life.
	Next step. The Ministry of Education Publications Series 2002:19, 2002	Constructivist approach, creating meaning.	IT as a tool to support learning, communication, interactivity, student centered learning, holistic approaches, authentic and complex situations
	From IT policy for society to politics for IT society. Government Bill 2004/05: 175., 2004	Providing competences for the information society.	IT should contribute to enhanced quality of life, sustainability,

Table 11.1 (continued)

Time periods	Policy documents	Goals and strategies of digital education	Role and function of technology in digital education
2010– Performance accountability		Theme: The use of big data and international comparison	Theme: Digitalization as an instrument in global competition
	A digital agenda in human service – a bright future can be ours. Government Official Report 2014:13	Education for the future. Societal values such as gender equality. Equal access to digital technology. Digital competence to be employable or capable to run a business.	Tools for learning in a modern education.
	National digitization strategy for the school system. The Ministry of Education 2017	Education to learn about and have the possibility to change the world. Education for democracy.	Effective use of the possibilities of digital technology for gaining knowledge and achieve equity. Technology provides conditions that steer, important to understand how technology works in order to know how to change.

descriptive and predictable information (Hardy, 2009). Policy research can also be regarded as a practice of trying to describe and analyze the effects of a policy that already exists or projecting large social effects of the policy structure. In this context, policy research is one step closer to examining policy relevance. It is focused on observing what motives for a policy change have been presented and what proposed impacts and effects of the policy have been argued for (Lingard, 2009).

To explore values and interests served by a particular policy, one strategy is to examine educational policy from a historical perspective, especially for determining "the major ideas, values and critical factors that have influenced and shaped the direction of education policy in a given period" (Phillips, 2003, p. 2). By relying on the framework (Sundberg, Chap. 6, this volume) and using a qualitative analysis software program for content analysis, we identified central themes in the selected documents (see Table 11.1). All documents included in this paper were read through several times by the authors aiming to provide both comprehensive and detailed information relevant to the themes. In the following Findings section, we elaborate on the analysis in more detail.

Findings

In the following section, we present an overview of the central themes in the policy documents in Table 11.1, followed by more detailed descriptions of the arguments contained in the selected policy documents regarding goals and strategies for digital education as well as the role of digital technology in digital education.

The Goal and Strategies of Digital Education

Centralization and Top-Down Initiatives

In the early years of digital education, the focus was on the provision of computer equipment and software for the late compulsory years. During the 1980s, a comprehensive investment in basic education had been carried out in the field of computers in schools by the state. It was intended to be implemented successfully over 3 years from the 1984–1985 financial year. As a stimulus to the municipalities, it was proposed that they should receive government grants (120 million SEK) for the purchase of computer equipment and software for all lower secondary schools. Regarding teacher competence, it was clearly reasoned that one or two teachers per lower secondary school should have a more qualified continuing education in IT. They will then pass on their knowledge of IT to their colleagues and become responsible for part of the computer teaching (Government Bill, 1983/84:100, 1983).

It was also proposed that special funds would be allocated partly for information and development work with a focus on computer teaching and partly to support the production of teaching materials in this area (Government Bill, 1983/84:100, 1983). As computer education would be integrated into the curriculum, teachers' access to computers and their computer literacy and skills training became a priority area for investment. The government decided that teachers who teach in social sciences and mathematics at lower secondary school and teachers in upper secondary school who teach computer learning and computer use could receive full pay for 3 and 5 weeks' training in computer education respectively (ibid.).

National efforts toward computerization in schools continued to expand during the late 1980s with a budget of approximately 460 million SEK over a 5-year period. The development emphasized working on a comprehensive experimental program in the computer education area with future proposals for both goals and content as well as organization. The requirement was for at least one computer per 25 pupils in primary school. Attention should also be paid to provide the necessary accessories, special keyboards, high-quality graphics, color, and sound (Ministry of Education, 1986).

The efforts required a review of knowledge that led to revision of the syllabuses. Based on the experience of local trial operations from previous periods and in-depth analysis of foreign experiences, the state now wanted to invest in a broad computer

education geared toward the public with more focus on adults' computer education from a working life perspective. Requirements for changes in teacher education had also been an important agenda to which method development for the use of computer-based technical aids was considered (Ministry of Education, 1983/84:100, 1983).

In spring 1994, the government appointed a commission to promote widespread use of IT in Sweden. One of its major initiatives was the National Action Program for ICT in Schools (ITiS) launched by the Swedish Government (Government Communication, 1997/98:176) in 1998. ITiS was an ICT project as well as a school development project. It included all educational actors in preschool, compulsory school, special school, Sami (minority folk) school, upper secondary school, and municipal adult education. All Swedish municipalities chose to participate in all parts of the program. Several guiding principles underpinned the planning of the program and informed the implementation in the municipalities. Equal standards between schools and equal quality for students as well as the dimension of school development were stressed (Ministry of Education, 2002).

Decentralization and Evidence-Based Practice

The restructuring of education during the 1990s had been a global movement with many similarities in various countries. Swedish education seemed to have restructured faster and more radically than most other countries. It turned into one of the most decentralized systems in the OECD countries. The first phase of the restructuring emphasized the decentralizing aspects of building large spaces for local decisions, followed by the municipalization and privatization of the school in the early 1990s. The state grants for IT investments to the school reduced; instead, more responsibility, both economically and politically, was given to the municipalities and local educational institutions. The Government Official Report (SOU, 1994) claimed that municipalities and schools, including independent schools, are responsible for promoting the use of IT in education and setting goals for how this should be done. Each municipality must work on a strategy for IT use and its expansion in the school:

> IT use in school cannot and should not be regulated from the central level. There is already support in the national documents and aims for the use of IT in school. The municipalities must therefore establish IT strategies that provide guidance and support and ensure that IT is part of the teachers' continuing education. (Ministry of Education, 2002, p. 17)

The principals have the same responsibility for their own schools. The use of IT in schools has increasingly been regarded as part of the school development work because successful use of IT often has its basis in a holistic view that includes organizational changes as well as new working methods and roles for teachers and pupils. However, more research into how IT best promotes school development and

how IT interacts with other measures and changes is claimed to be needed (Ministry of Education, 2002).

Decentralization, marketization, and privatization of education also demand collaboration among various sectors and stakeholders. The Agency for School Development is given the task to design a support for cooperation between public and private actors' so-called public–private partnership model (PPP cooperation). It is argued that the IT area in the school is suitable for such a model "because IT use as support for learning creates new needs within the school and can create new markets" (Government Bill, 2004/05:175, 2004, p. 109). To ensure sustainable technical solutions, the government also believes that this type of cooperative agreement should be based on open standards. Standards and recommendations are being developed in collaboration with both international and national standardization bodies. Cooperation also takes place within the framework of the Swedish School Data Network as well as the European School Data Network (ibid.).

To support schools' continued digitization, Sweden's Municipalities and Counties (SKL, changed to Sweden's Municipalities and Regions in 2019) developed a framework for evaluating how well schools are benefiting from the possibilities of digitization, LIKA (i.e., *ledning, infrastruktur, kompetens och användning.* It means management, infrastructure, skills and use in English) in 2013 to serve as a tool, particularly for principals' use, to develop strategies and to drive change work with ongoing evaluation: "The objective is that the tool should be clear and self-explanatory for the evaluation and development of the school's digitization. The tool should also be used for monitoring and comparisons of IT maturity among schools" (SOU, 2014, p. 131).

The importance of evaluation, research and international statistical comparison has been highlighted in the policy documents since the 2000s, following the international trend of evidence-based practice as support for policymaking.

> A large part of this material is based on statistical surveys mainly from the Swedish National Agency for Education and a European survey as the goal of the digital agenda, that Sweden should be the best in the world in using the possibilities of digitalization, comparisons are made from the survey between Sweden and the three countries that various issues lie mainly in Europe ... (SOU, 2014, p. 131).

Large state funding initiatives have been implemented since the early 2000s. The Swedish Research Council and the Swedish Innovation Systems Agency (Vinnova) are the largest state financiers of technology-related research, including research on IT use in schools, in cooperation with universities and colleges. The Swedish Research Council is responsible for basic research, whereas Vinnova is responsible for more applied research (Government Bill, 2004/05:175, 2004). The Ministry of Education Publication Series 's (Ministry of Education, 2002) recommendations and proposals for future IT actions in schools are based on a variety of previous research, including classroom research. The National Agency for Education is also tasked with speeding up the codification of successful local practices for digital-based teaching so as "to become proven experience that can be used in professional development efforts throughout the country" (SOU, 2014, p. 200).

The Use of Big Data and International Comparison

One of the political goals of IT is for Sweden to become the best in the world in using digital technologies. However, the goal that needs to use international indexes and rankings that measure digitization is relative: "An international outlook of this type can help capture what is happening today and give perspective to what we do to move our positions forward" (SOU, 2014, p. 36). Since the 2010s, the statistical databases at the Digital Agenda Scoreboard and the ICT Development Index (IDI) from the International Telecommunications Union (ITU) have been used as a basis for arguments presented in the IT policy documents. Based on these data, it was confirmed that Sweden already had a very strong position in international comparisons and has consistently ranked at the top in the latest rankings. Sweden was the only country among the three ranked highest on some of the more important indexes that measure digitalization in the world, as it referred to the Digitalization Commission's report from 2013 (ibid.).

Comparison has also been used as a strategy to inform and reinforce the argument and to strengthen the recommendations in the area of digital education. One example included introducing international developments in curriculum that appeared to follow different development trends with an increased focus on introducing programming as a separate subject in primary school. By referring to UK's adopted national curriculum in 2013, in which it included goals with programming (computing) in all age categories, the Swedish government argued for a same direction towards that everyone needs to learn how to program code if Sweden wants to "continue to be a strong knowledge nation and maintain its competitiveness" (SOU, 2014, p. 50). By programming, "it is not intended to learn a specific programming language. Instead, the broader concept of programming (which can also be said to include modelling problems, abstraction, logic, etc.) is intended" (ibid. p. 50). This is also clearly stated in the National Digitization Strategy for the School System (Ministry of Education, 2017):

> All children and students need to gain an understanding of how digitalization affects the world and our lives, how programming controls both the flow of information we are accessed as well as the tools we use, as well as knowledge of how technology works. (p. 3)

Another example is the influence of large-scale international comparative studies (e.g., PISA and PIRLS) in educational policymaking. This is in line with the trend of evidence-based practice that focuses on the use of the best available evidence to bring about desirable results or prevent undesirable ones. As schooling is generally considered successful only when the predetermined outcomes have been achieved, education worldwide therefore makes excessive requirements of assessment, measurement, testing, and documentation. Digitalization in schools is closely linked to this trend, partly because (a) digital technology allows for the execution of large international tests and studies, as well as the availability of big databases, and (b) digital competence is an important part of the knowledge, skills, and learning that are integrated into the assessment, measurement, testing, and documentation (SOU, 2014).

The Government Official Report (SOU, 2014) discussed the PISA results with a focus on comparison between traditional reading and digital reading, in which the Swedish students from 2012 seemed to be better at digital than traditional reading. It referred to a report of the National Agency for Education that states "traditional and digital reading can be regarded as different types of reading, but also as components of an overall literacy" (p. 133). It was also found that the advantage that Swedish students previously possessed had now also disappeared in the digital field. The result in digital reading had dropped and was now at the average level as in other participating countries, because the previous advantage was based on the fact that IT was introduced earlier in Swedish schools. If Sweden is to maintain its self-image of being a model for the world, it should continue to invest in IT in schools, and this is not about whether IT can make traditional schools more efficient but what new technology-supported methods can improve students' learning (SOU, 2014). It is argued that IT knowledge and skills are an essential part of determining if students will be able to work in the emerging society. Furthermore, the school "should develop techniques to identify and measure these knowledge and skills" (p. 135). Much like other educational policies and reforms, there is no doubt that digital education in Sweden, due to the diminished results of both international and national academic assessments since the late 2000s, has looked beyond the country's borders to find educational policy models and legitimacy for the implementation of digital education policy changes.

The Role of Digital Technology in Education

Digitalization as a Means for Achieving Equality and Equivalence

Following reflections on the previous top-down national IT strategy, which focused only on providing computers to teachers and equipping schools with computer labs for student use and led to slow IT development in schools, the focus of IT in schools has shifted to promoting technology's role in education's changing connection to its social missions. This strategy emphasizes the importance of broad and developed IT use and states that access to and effective use of IT should not be limited to education in the schools, but should also be important for everyday life and working life in society as a whole to enhance quality of life and make the workforce more competitive internationally. The concept of lifelong learning in relation to IT efforts emerged in the late 1990s (Ministry of Education, 2002).

It is argued that due to changes in society, the role of schools must be partly redefined. Schools play a compensatory role in IT development in society, which is important for the general task of giving everyone an equal education and achieving equality. However, according to the Ministry of Education (2002), there are a number of paradigm shifts that have taken place in recent years in view of IT and

education due to the Internet. It is thought that the discussion is no longer about the education system but instead the "learning process." Now it is no longer talking about "offering education" but "facilitating access for a variety of learners," not "technology" but "content and people," not "individual efforts and projects" but "exchange and collaboration," not "learning to use ICT" but "using ICT to learn." (pp. 20–21). The political arguments for expanding IT elements in education can therefore be seen as twofold: first, from a socioeconomic perspective, the workforce must possess IT skills, and schools should contribute to this. Investing in IT in schools is also necessary to provide students with civic competence. Second, IT in schools is a means for creating equal opportunities between students and thus helping to create an equal schooling by reducing digital divisions (SOU, 2014).

Another aspect of the importance of IT in schools connects to democratic values regarding gender equality. As early as the 1980s, gender issues related to women's use of computers were highlighted. It was necessary to increase women's interest in computer technology and to recruit women to study computer focused fields. Thus, the state and the Study Association initially made grants for special courses for women (Government Bill, 83/84:100). The issue of gender equality has been emphasized in most policy documents over the years. It is stated in the National Digitalization Strategy for the School System (Ministry of Education, 2017):

> The inclusion of an equality perspective in the work with digitalization is thus important for the opportunity to achieve the gender equality policy goal of equality education. In the work on digitization, it is therefore important to have an equality perspective to ensure that all children and students are given the same conditions and opportunities. (p. 7)

The importance of digitalization has also been highlighted in connection to special education. As the Ministry of Education (1986) stated in its action plan, "special attention is paid to questions about the computer as support for students with special difficulties and, among other things, studying how computer support can be used to support and improve the learning of disabled students" (p. V). Some efforts were already ongoing during the 1980s. For example, the government provided special schools and their resource centers with additional support and aid and gave them better opportunities to provide disabled students with computer based technical aids, including the purchase of equipment and software in the special school (ibid.). Due to these efforts, "the special school has during the 1990s become one of the most computer-dense educational environments in the school" (Government Communication, 1997/98, p. 22).

IT access for students with disabilities received a great deal of attention during the digitalization developments of the 1990s and early 2000s. This occurred in two steps: access to computer based reading and writing tools that students could manage independently, as well as access to the Internet and e-mail so they could gain knowledge source and the possibility of communication that creates completely new opportunities for participation and equality (ibid.). It is claimed that IT can contribute actively to creating openness and accessibility for children, adolescents, and adults with disabilities. Without accessibility of people with disabilities, "IT instead contributes to alienation, exclusion, and segregation" (Ministry of Education,

2002, p. 81). Government Official Report (SOU, 2014) referred to the Swedish School Inspectorate's review of the use of IT tools in 2012. This review cited reports from the National Agency for Education and the Special Education Agency, which stipulated that proper use of IT tools contributes to more effective learning through improved individual adaptation, increased motivation, and student collaboration. It also pointed out that modern IT tools have proven particularly valuable for teaching students who need special support.

Digitalization as a Tool for Effective Teaching and Learning

Arguments for investing in IT in schools have always been linked to teaching and learning, but the focus has varied over time. Policy documents from the 1980s revealed a strong focus on treating computer knowledge as a separate subject through computer instruction. The compulsory education curriculum from 1980 included teaching in computer knowledge i.e. teaching about computers and their use at the lower secondary level within the framework of first-hand mathematics, as well as social and nature oriented subjects. This computer education was aimed at informing students about the use of computers in society. It also emphasized the students' understanding of that technical aids are controlled by people. Computer education should also focus on computer functions and emphasize computer programs, tasks, and methods for problem-solving as stated in Government Bill 1983/84. Computers' practical functions were the particular focus of an argument for the importance of giving students access to computer education in two-year vocational programs (ibid.). It claimed that "In the long term, the opportunity should be taken into account to give the students an expanded teaching on mini and large computer environment with regard to system and program development. Computer communication should also be an essential element of this teaching" (Ministry of Education, 1986, p. VI).

Since the 1990s, technology's role in education has become more visible in governance documents, which argue that IT can constitute a new way of gaining and utilizing knowledge and contribute to the development of new teaching methods in schools, at a distance, in youth education, and in lifelong learning. IT's contribution to opportunities for distance education was highlighted as contributing to the dissemination of information about educational and technical opportunities and emphasizing good examples nationwide. IT was no longer treated as a separate subject in schools, but was expected to function as an integrated educational aid in all courses and subjects and for all students (SOU, 1994).

> All students in the school should learn how to use IT. In this way, the teaching environment can be renewed, pedagogy developed and learning improved. This releases the creativity of both teachers and students. It provides increased opportunities for personal development and success in the professional world. (p. 9)

Seeing IT as a teaching aid in teaching changed the view of teachers' roles and their competency required. The policy documents highlighted the importance of investing in IT professional development and training for teachers. This led to a national program for IT in school (ITiS) from 1999 to 2002. The program had two parts: the first gave teachers knowledge about computers, and the second, which was the program's focus, emphasized the use of computers as educational tools in daily activities at school. This part addressed how students could use computers in this context to gain various forms of knowledge (Government Communication, 1997/98:176).

Including IT in teacher education also attracted attention in the late 1990s by facilitating some reflections:

> But the experience of that work does not seem to have been systematically transferred to ordinary activities and many universities still seem to lack a conscious and in-depth discussion about IT's long-term impact on the school, the teacher role and not least the school subjects. An evaluation of the use of IT in teacher education, especially regarding the didactic discussion, would be desirable and possibly lead to recommendations on measures. (Ministry of Education, 2002, p. 37)

Research on computer use in teaching and learning environments usually emphasized and supported the use of computers as educational tools. The Ministry of Education (2002) referred to the Knowledge Foundation final evaluation report by the ELOIS group, which confirmed that the general perception of what occurs in the classroom is that teachers' roles have changed, students are more active and work more individually, and computers are integrated into teaching. However, it also reported that the use of computers to search for information on the Internet was so dominant that "IT is a versatile tool in single-track use" (ibid. p. 29). The Ministry of Education (2002) also cited another study, which indicated that "computer supported individual work under supervision hardly [is] an appropriate pedagogy for tomorrow's school. It probably leads to IT one-sidedness, depletion and increased stress" (pp. 29–30).

When such critical arguments appeared in earlier documents, later policies had a more positive view of IT use in teaching and learning. In its 14-page *Digitization Strategy for the School System*, the Ministry of Education (2017) used the word *opportunities* 27 times, while the word *Problem* was not mentioned at all. Digitalization in schools has been appreciated with the assertion that IT contributes to effective learning in terms of improved student achievement and reduced administration by teachers. Often, the benefits of technology relate to increased opportunities for teachers and students to access open and rich resources for teaching and learning, open communications, and networked and collaborative learning. Digitalization has created opportunities for individually adapted and flexible learning based on students' diverse conditions. When students and learning are at the center of education instead of teachers and teaching, digitalization is a decisive factor that influences the culture of education (SOU, 2014; Ministry of Education, 2017).

Digitalization as an Instrument for Global Competition

Since the 1990s, neoliberal thinking has dominated much of the restructuring rhetoric nationally and worldwide, leading to the economization of educational discourse. As a result, accountability, competitiveness, and performance (goals and standards) have led to the targeting of performance indicators as an important education reform strategy. In education, extended national evaluations and international performance tests (e.g., PISA, PIRLS) showed that Swedish students performed quite well until the first half of the 1990s. After that, and especially after 2000, results declined, particularly in mathematics and science. Policy documents since the mid-2000s have inevitably referred to these international standard test results to justify their demands for increasing the quality and efficiency of teaching and learning in Swedish schools. Integrating digital technologies into teaching and learning is regarded as one solution for reaching this goal because "IT is seen as a tool to increase learning efficiency. IT is said to be a catalyst for change that can make the school more flexible and increase the quality of learning" (SOU, 2014, p. 134). However, the document also stated that even though many studies question whether IT can improve students' school results and only few studies have provided clear answers, more research and evidence are necessary.

On the political level, digitalization in schools is regarded as playing an important role in helping train the future workforce and enhance innovation to succeed in international competition. It is argued that through the use of IT in schools increases opportunities for students to learn important future skills, such as critical thinking and creativity. In its policy document *National Digitization Strategy for the School System*, the Ministry of Education (2017) stipulated that one purpose of the strategy is that all students should have the opportunity to develop adequate digital competence. This, in turn, requires giving students the opportunity to develop their ability to use digital technology, which "is becoming increasingly important for the future working life" (Ministry of Education, 2017, p. 6).

The notion of digitalization, which is a central concept in IT politics, was first discussed and defined officially in a report by the Digitalization Commission on behalf of the Swedish government (SOU, 2014), which stated:

> Digitalization today is usually used in two different meanings. Partly as information digitalization, that is, the transformation of information into digital form, and partly as social digitalization, that is (increased) use of IT in a broad sense in society. (p. 28).

It is believed that digitalization and IT based solutions can increase the availability and efficiency of companies and public sectors, including education. The government's digital agenda reflects the need for both forms of digitalization, but its digital agenda and the establishment of the Digitalization Commission in 2012 were motivated primarily by a desire to promote social digitalization "to use it and its applications for increased innovation power, profitability and competitiveness" (SOU, 2014, p. 29).

Discussion and Conclusion

The development of digital education and digitalization in schools can be placed in the three periods linked to Swedish educational reforms over time, as suggested by Sundberg (Chap. 6, this volume). However, these timeframes need to be regarded as rather loose. Ideas do not shift instantly, so the suggested visible patterns in policy arguments can be related to and partly understood in terms of changing political circumstances over time and governing models with overlaps and recurring themes. Thus, certain topics are common in various documents from different periods.

Over the years, the hope or hypothesis emerged that digital education could strengthen social values such as gender equality and inclusion. Education for all and integration have been the main purposes and principles of the comprehensive education system since its establishment in the 1960s, which is connected to the Nordic education model characterized by a number of overall values such as social justice, equality, equal opportunities, integration, and democratic participation for all students regardless of social and cultural background and abilities (Imsen, Blossing, & Moos, 2017; Lundahl, 2016). There are discussions today about how this model relates to the changed conditions, as it seems that these values are influenced by the reforms that have taken place in the different Nordic countries. What has been common is that all these countries have flexible curricula and open-up learning objectives in conjunction with the trust in the teacher professionalism and the ability of individual schools to bring these values into practice. Thus, the main structure remains in the surface, as it is argued by Imsen et al. (2017). The result also implies that the Swedish government believes that digital education and increased technology use will increase opportunities for all to access knowledge and social participation, which can increase equality in schools in general and in gender quality in particular. Technology is also considered as an effective educational tool that can support the learning of children and young people with disabilities. However, technology may also entail the risk of preventing women from taking advantage of technology because the properties of technology are considered as more masculine in nature, and therefore it is important to pay attention to the gaps that may arise in technology use in education. Some researchers also pointed out that digitalization in schools has led to further undesirable consequences, such as in the case of digital divisions between children and young people, as well as their parents, due to different socioeconomic and cultural or linguistic backgrounds. Thus, the concept of digital exclusion has emerged in recent debates and research (Helsper & Reisdorf, 2017; Van Deursen & van Dijk, 2015).

In all policy documents, technological conditions are regarded as a basic prerequisite for the positive effect of digital education, regardless of which technology the documents address. From earlier years' focus on providing computers at school to access to software programs, Internet access, online learning resources, networked and interactive learning platforms, the one-to-one initiative, and access to databases for national and international comparisons, it is believed that digital equipment and resources, infrastructure, and supporting service systems are the most basic but

most important conditions for digital education. Investment costs money, so local economic conditions play an important role in development at the local and institutional levels. Digital education policies after the 1990s focused on pointing out the factors and dangers of increased inequality in digital education between various municipalities and schools. Research and investigations have also revealed differences between large and small municipalities, between schools in different areas, and between public and independent schools, not only regarding access, but also in terms of use and digital competence (SKL, 2016; Swedish Parliament, 2016).

Another area of attention in all documents is the importance of developing teachers' digital skills. This is considered as a basic prerequisite for digital technology use in classrooms to increase the effectiveness of teaching and learning. Since the 1980s, the state has invested considerably in teachers' continuing education in this field in various ways. It has also placed increased demands on teacher education related to future teachers' digital skill development. Later, it also emphasized the digital skills of school leaders and all school staff on the grounds that digital education is not merely a matter of individual teachers' skills and will or using technology in classroom instruction. Rather, it is an organizational and school development issue, especially given the increased national and international comparison and competition in the education market, which has increased demands for local accountability and self-regulating regarding education quality issues (Selwyn, 2016; Williamson, 2016).

However, there are some clear links between arguments presented in the various documents and the proposed governing models. The arguments apply to digitalization strategies and goals, as well as technology's roles and functions in education, as illustrated in Table 11.1. The normative ideal of the rationalist perspective on decision-making is based on trusting state actors' and agencies' knowledge and power derives from a centralized and universalized governance model (Lindblad & Lundahl, 1999). Policy documents from the 1980s provided clear evidence of this pattern, such as detailed recommendations on the number of students per computer and the number of hours and course points for teacher in-service training. Digitalization in schools also had a clear top-down strategy in which extensive state investment was distributed to the local without accounting for local needs and conditions.

Since the 1990s, the Swedish education system has undergone radical restructuring. Decentralization, marketization, and privatization place demands on local responsibility and self-control. The demand for local investment in digitalization in schools has increased, and the development of teachers' digital skills has become more locally adaptable. Quality and effectiveness have been the central concepts used in the policy documents with a clear link to neoliberal ideology. Digital education strategies have followed this trend with an emphasis on promoting the effective use of digital tools in teaching and learning.

Governing by results also became increasingly dominant after the 2010s, as measurable school and pupil performance became indicators for comparison and evaluation. Access to national and international big data also allowed local and individual schools to compare and control their own results as instruments for self-evaluation

and self-accountability for the school's quality work (Lingard, 2009; Ozga, 2016; Dahler-Larsen, Segerholm, et al., 2011; Souto-Otero & Beneito-Montagut, 2016). The use of international standards, benchmarks, and comparisons has also become an important manner to increase competitiveness in a global context, which is rooted in the belief of evidence-based practice. It is based on a logic that what works is that we can produce an output or an improved output if we deliver what we intervene into an already existing practice. However, the danger is to be contextless and eventually become one-size-fits-all. Instead of what works in the end, it is about how we can make it work (Adolfsson, Forsberg, & Sundberg, 2018; Kvernbekk, 2017). Arguments in digital education policy in the 2010s focuses largely on the statistical comparison of the results from the major international tests as a powerful evidence to justify the agenda and efforts of enhancing digital technology in education to improve the quality of education and the pupils' digital skills in order to increase their competitiveness in the future global labor market.

In conclusion, even though the digitalization of Swedish schools has been ongoing for somewhat 40–60 years laying the grounds for what today can be considered as digital education, its formation in policy and practice has not been comprehensively described in research. In this chapter, we have tried to capture this process using a rather narrow sample of policy texts in the area selected within the suggested timeframes by Sundberg (Chap. 6, this volume). We have analyzed the goals and strategies for commitment, initiative, and implementation of digital education proposed and argued for in the policies during these three periods, and we have related these to the role of digital technology in digital education as it formulated, expressed, and justified in the policy documents. The ambition has been to critically analyse how digital education policy changes can be understood in relation to various phases of Swedish educational reform. As education in Sweden becomes increasingly digital, understanding the origins of digital education is an important part of understanding the future trajectory of education at large.

References

Adolfsson, C., Forsberg, E., & Sundberg, D. (2018). When the evidence movement came to the Sedish school. In D. Alvunger & N. Wahlström (Eds.), *The evidence-based school – The Swedish school in the intersection between research and practice* (pp. 71–99). Natur & Kultur: Stockholm.

Bezemer, J., & Kress, G. (2016). *Multimodality, learning and communication. A social semiotic frame*. London: Routledge.

Carlgren, I. (1995). National curriculum as social compromise or discursive politics? Some reflections on a curriculum-making process. *Journal of Curriculum Studies, 2*, 411–430.

Carlgren, I. (2009). The Swedish comprehensive school—Lost in transition? *Z Erziehungswiss, 12*, 633–649.

Dale, R., & Robertson, S. (2009). *Globalisation and Europeanisation in education*. Oxford: Symposium Books.

Government Bill 1983/84:100. (1983). *Appendix 10 to the Budget Bill 1984.*

Government Bill 2004/05: 175. (2004). *From IT policy for society to politics for IT society*. Government Communication 1997/98:178. (1978). The learning tool – National program for IT in school.

Haglind, T. (2015). *Digitalization of upper secondary school: Access and use*. Diss. Gothenburg: Gothenburg University.

Hamngren, I., & Odhnoff, J. (2009). *They built the Internet in Sweden*. ISOC-SE.

Hardy, I. (2009). The politics of educational policy studies: A preliminary analysis of leading educational policy journal publications. *Critical Studies in Education, 50*(2), 173–185.

Helsper, E. J., & Reisdorf, B. C. (2017). The emergence of a "digital underclass" in Great Britain and Sweden: Challenging reasons for digital exclusion. *New Media & Society, 19*(8), 1253–1270.

Holmberg, J. (2019). *Designing for added pedagogical value – A design-based research study of teachers' educational design with ICT*. Diss. Stockholm: Stockholm Universitet.

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.

Jedeskog, G. (2005). Ch@nging school. In *Implementation of ICT in Swedish school, campaigns and experiences 1984–2004*. Uppsala: Uppsala Universitet.

Kress, G., & Selander, S. (2012). Multimodal design, learning and cultures of recognition. *Internet and Higher Education, 15*(4), 265–268.

Kvernbekk, T. (2017). Evidence-based educational practice. *Oxford Research Encyclopedias*. https://doi.org/10.1093/acrefore/9780190264093.013.187

Lawn, M., & Grek, S. (2012). *Europeanizing education: Governing a new policy space*. Oxford: Symposium Books.

Lindblad, S. (2018). Education governance by results? On communication in a performative turn in Swedish education. In E. Hultqvist, S. Lindblad, & T. Popkewitz (Eds.), *Critical analyses of educational reforms in an era of transnational governance* (Educational governance research) (Vol. 7, pp. 63–76). Cham: Springer.

Lindblad, S., & Lundahl, L. (1999). Education for a re- or de-construction of the 'strong society'? In S. Lindblad & T. S. Popkewitz (Eds.), *Education governance and social integration and exclusion: National cases of educational systems and recent reforms* (Uppsala reports on education 34) (pp. 204–222). Uppsala: University of Press.

Lindvall, J., & Rothstein, B. (2006). Sweden: The fall of the strong state. *Scandinavian Political Studies, 29*, 47–63.

Lingard, B. (2009). Researching education policy in a globalized world: Theoretical and methodological considerations. *Yearbook of the National Society for the Study of Education, 108*(2), 226–246.

Lundahl, L. (2016). Equality, inclusion and marketization of Nordic education: Introductory notes. *Research in Comparative & International Education, 11*(1), 3–12.

Ministry of Education. (1986*). Action program for computer education in school, adult education and teacher education*.

Ministry of Education. (2002). *Next step*.

Ministry of Education. (2017). *National digitization strategy for the school system*.

National Agency for Education. (2009). *Reporting the mission on follow-up of IT use and IT skills in preschool, school and adult education.*

National Agency for Education. (2013). *IT use and IT skills in school. Report 386*.

National Agency for Education. (2016*). IT use and IT skills at school – The Swedish National Agency for Education's IT follow-up 2015*.

National Agency for Education. (2018). *Digitization at school – Opportunities and challenges.*

National Agency for Education. (2019). Digital competence in preschool, school and adult education – The National Agency for Education's follow-up of the national digitalization strategy for the school system, 2018.

Ozga, J. (2016). Trust in numbers? Digital education governance and the inspection process. *European Educational Research Journal, 15*(1), 69–81.

Ozga, J., Dahler-Larsen, P., Segerholm, C., et al. (Eds.). (2011). *Fabricating quality in education: Data and governance in Europe*. London: Routledge.

Pettersson, O. (2013). Swedish politicians have had a worse decision making. *Response, 5*, 11–12.

Phillips, R. (2003). Education policy, comprehensive schooling and devolution in the DisUnited Kingdom: An historical 'home international' analysis. *Journal of Education Policy, 18*(1), 1–17.

Ravelli, L. J., & van Leeuwen, T. (2018). Modality in the digital age. *Visual Communication, 17*(3), 277–297.

Ringarp, J., & Waldow, F. (2016). From 'silent borrowing' to the international argument – Legitimating Swedish educational policy from 1945 to the present day. *Nordic Journal of Studies in Educational Policy, 1*.

Rosenkvist, M. A. (2010). *Using student test results for accountability and improvement: A literature review*. OECD education working papers 54. OECD Publishing.

Selwyn, N. (2016). There's so much data: Exploring the realities of data-based school governance. *European Educational Research Journal, 15*(1), 54–68.

SOU (Government Official Report). (1990). *Democracy and power in Sweden* (1990:44). Stockholm: The Ministry of Education.

SOU (Government Official Report). (1994). *Wings for human ability*. Stockholm: The Ministry of Education.

SOU (Government Official Report). (2014). *A digital agenda in human service – A bright future can be ours*. Stockholm: The Ministry of Education.

Souto-Otero, M., & Beneito-Montagut, R. (2016). From governing through data to Governmentality through data: Artefacts, strategies and the digital turn. *European Educational Research Journal, 15*(1), 14–33.

Sweden's Municipalities and County (SKL). (2016). *Municipalities' digitization – How is the situation 2016?*

Swedish Parliament. (2016). *Digitalization at school – Its impact on quality, equality and results in education.*

Tallvid, M. (2015). *1: 1 in the classroom: Analysis of an educational practice in change.* Diss. Gothenburg: Gothenburg University.

Tveit, S., & Lundahl, C. (2017). New modes of policy legitimation in education: (Mis)using comparative data to effectuate assessment reforms. *European Educational Research Journal, 17*(5), 631–655.

van Deursen, A., & van Dijk, J. (2015). Toward a multifaceted model of internet access for understanding digital divides: An empirical investigation. *The Information Society, 31*(5), 379–391.

Willermark, S. (2018). *Digital didactic design: To develop teaching in and for a digitalized school.* Diss. University Väst.

Williamson, B. (2016). Digital education governance: An introduction. *European Educational Research Journal, 15*(1), 3–13.