



JÖNKÖPING UNIVERSITY

*School of Education and
Communication*

Doctoral Thesis

One-school-for-all As Practice

– A Nexus Analysis of Everyday Digitalization Practices

Lars Almén

Jönköping University
School of Education and Communication
Dissertation Series No. 039 • 2021



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Doctoral Thesis in Educational Sciences

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Abstract

The point of departure for this thesis is the Government of Sweden's 2017 strategy to digitalize the entire Swedish educational system, with a special focus on what here is conceptualized as the one-school-for-all discourse. As the perspective of the thesis is temporally and spatially multi-scalar, the theoretical and methodological framework of nexus analysis is used, which is well suited for analyzing multi-scalar phenomena. Nexus analysis is ethnographically inspired, with a point of departure in sociocultural perspective. Three research questions guide the study:

- Which discourses in place, discursively entwined with the one-school-for-all discourse, were circulating across time in the shaping of the Swedish digitalization strategy?
- Which discourses in place, discursively entwined with the one-school-for-all discourse and with a special focus on digital tools and classroom interaction orders, were circulating among secondary students before the enactment of the Swedish digitalization strategy?
- Which discourses in place, discursively entwined with the one-school-for-all discourse and with a special focus on issues of identity and inclusion, circulate or were circulating in secondary classrooms after the enactment and in the implementation process of the governmental digitalization strategy?

The overall aim of this nexus analysis is to map the cycles of discourse entwined with one-school-for-all, from macro policy to micro classroom levels, that intersect in the nexus of practice of the strategy to digitalize the Swedish school system. The rationale for the digitalization strategy was to include all schools and students in the digitalization process, irrespective of students' age or other background indicators, and compensate for digitalization differences between schools and students, as part of the one-school-for-all discourse. The digitalization strategy is formulated in three focus areas: all parts of the school system shall have equal digital competence, all parts of the school system shall have equal access to and usage of digital tools, and finally, research and follow-up on the possibilities of digitalization shall be conducted. The first two focus areas are framed by the one-school-

for-all discourse, while the third focus area ensures a long-term perspective and follow-up.

Framed by a sociocultural perspective, the ethnographic data material that this thesis builds upon comprises audio and video recordings, photos, fieldnotes, policy documents, student work sheets, and timetables. The classroom data (recordings, fieldnotes, etc.) are from grades 7 and 8, where students are 13 and 14 years of age, in five secondary schools in one small and one medium-sized municipality in southern Sweden.

This compilation thesis comprises four different studies. The discourse analysis in Study 1 shows how discourses in the policy documents behind the digitalization strategy circulate around the need to compensate for the unequal digitalization of education, and how the digitalization strategy should promote equal digital competence and programming skills. Study 1 also highlights how the gender equality discourse is discursively entwined with the programming discourse and the one-school-for-all discourse.

In Study 2, students in interviews provide accounts of the everyday use of digital tools in secondary schools before the enactment of the digitalization strategy. Two sub-discourses of the one-school-for-all discourse are identified in the student accounts: 1) Students who are marked by some type of special needs express an appreciation of these digital tools based on their mediation and facilitation of participation in educational activities and tasks. 2) Students account for how it is the school's responsibility to compensate for socioeconomic vulnerability. The students further highlight that when they are working with digital tools, they experience an increase in their control over their learning process. The students in Study 2 account for how the computer room is the primary school space in which they use digital tools. The computer room discourse could be considered to be discursively entwined with one-school-for-all discourse, as the computer room facilitates equal access to digital tools in a school where the students do not have ubiquitous access to them.

Studies 3 and 4 are founded on data produced in field work in a secondary school, that is called Secundus School in this thesis. Study 3 illuminates how digital tools can act as gatekeepers for both classroom inclusion and exclusion as they facilitate compensation for deficits due to, for example, disability, and at the same time facilitate the possibility of working with things other than the subject in focus. Furthermore, Study 3 illustrates how actors as different as

(human) teachers and (material) policy can act as gatekeepers for participation. In this way, Study 3 contributes to the nexus analysis through discourse cycles of agency and identity positioning.

Study 4 shows how the digitalization of education redistributes authority in the classroom from teachers to students, i.e., discourses of agency. While students work with both school-provided and personal digital tools, their personal tools become new tools for identity positionings and languaging in school settings. Furthermore, given that not all students can afford the latest models, these personal tools also function as tools of inclusion and exclusion. Hence, already marginalized students risk being further marginalized and excluded through mundane processes in contemporary classroom settings.

The digitalization strategy divides the temporal space by before the enactment of the digitalization strategy and after the enactment, i.e., in the implementation phase of the digitalization strategy. Before the digitalization strategy, the computer room discourse was circulating in the school. After the enactment, the students had ubiquitous access to digital tools, which has both inclusive and exclusive consequences. For students with special needs, ubiquitous access to digital tools facilitates learning. However, when all students have access to digital tools, students with special needs lose some of the compensatory effects of the digital tools. Both digital tools provided by the school and personal digital tools become tools for identity mediation in a classroom with ubiquitous access. However, personal digital tools are not available for socioeconomically vulnerable students and hence could become tools for exclusion from the classroom community.

Given that the students have ubiquitous access to digital tools, the second focus area of the digitalization strategy can be considered to be fulfilled. However, the fieldwork observations show that digital tools are used as tools to facilitate learning to only a minor extent. The thesis argues that the reason digital tools are not used to facilitate learning is that the first focus area has not been prioritized in the schools to the same extent as the second. While the schools bought digital tools, they did not adequately consider how to use them pedagogically. Further, the thesis argues for the importance of teachers' further education on the pedagogical usage of digital tools. The thesis concludes that digitalizing the school requires that schools do more than just buy digital tools and argues against the technology deterministic belief that

digital tools *per se* will facilitate learning. However, the digital tools are pedagogic affordances when teachers and students show digital competence, i.e., when the digital tools are used in creative ways and function as *mediating tools* for learning.

Key words:

nexus analysis, digitalization, one-school-for-all, inclusion, identity

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Gohult, August 2021

Original papers

Paper 1

Inscriptions and Digitalization Initiatives Across Time in the Nation-State of Sweden: The Relevance of Shifts and Continuities in Policy Accounts for Teachers' Work

Lars Almén and Sangeeta Bagga-Gupta

Paper 2

Access to and Accounts of Using Digital Tools in Swedish Secondary Grades. An Exploratory Study

Lars Almén, Sangeeta Bagga-Gupta, and Cecilia Bjursell

Paper 3

Gatekeepers and gatekeeping: On participation and marginalisation in everyday life

Sangeeta Bagga-Gupta, Giulia Messina Dahlberg, and Lars Almén

Paper 4

Inclusion, exclusion, and identity positioning in the digitalized classroom: going beyond the “digitalization” in a digitalization strategy.

Lars Almén

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Introduction

It was the mid-1980s at Folkungaskolan, a lower secondary school in the city of Linköping. I was attending grade 8 and my physics teacher had bought a few Commodore VIC 20 computers and placed them in the laboratory. He considered computers to be an important future tool in physics education, but did not know what to do with them, or how to use them. A few years later, in upper secondary school, my math teacher introduced the class to the Luxor ABC 80 computer, as the 1980 mathematics curriculum included the use of computers. However, neither the math teacher knew how to use the computers.

Ten years later, as a newly graduated upper secondary teacher, I taught adult students how to use computers. The students used word-processing software to write texts and desktop publishing software to produce posters and brochures. A new phenomenon, the internet, had entered the scene. However, its content was sparse, and the connections were slow.

In 1998 I started to work with young upper secondary students. A year later I became involved in the comprehensive governmental project ITiS (IT in School, in Swedish *IT i Skolan*). ITiS was a large-scale project that ran from 1999 to 2002 and involved 75 000 teachers (Chaib et al., 2004). All teachers who were involved in the project were offered further education and had a laptop computer at their disposal (The Government of Sweden, 1998). However, it was up to every responsible authority to organize the teachers' further education and to decide how to distribute the laptops to the teachers (The Government of Sweden, 1998). Some authorities distributed laptop computers to teachers for their own use, others distributed laptop computers to teams of teachers. One important rationale for providing the teachers with a laptop as part of the ITiS project was to integrate information technology into everyday education. All over Sweden, including in my own school, teachers brought their laptops to the classroom and searched for information on the internet, produced PowerPoint presentations, and wrote instructions in word-processing software. The students, however, were still obliged to use computer rooms at their schools, where they often searched for information on the internet, wrote texts with word-processing software, and produced presentations with PowerPoint (Chaib et al., 2004).

My own academic and professional career, from lower secondary student to upper secondary teacher, runs parallel to the digitalization of the Swedish school system. The use of computers in education became a part of the national Swedish curriculum in 1980 (Skolöverstyrelsen, 1982). Today, in 2021, Swedish schools are digitalized to a great extent. Three of four secondary school students have a personal computer they can use in school, and the computer density is 1.3 students per computer in lower secondary school and nearly one student per computer in upper secondary school (The Swedish National Agency for Education, 2019a). Computers, mobile phones, and tablets share desktop space with textbooks, papers, and pencils. Digital tools¹ have to a large extent become a natural part of the classroom environment, and they blend naturally with other technology, like textbooks, pencils, and papers (Garcia et al., 2018). However, searching for information, writing texts, and producing presentations were still 2016, almost twenty years after the ITiS project, areas where digital tools are predominant in Swedish schools, both among students and teachers (The Swedish National Agency for Education, 2016). Using digital tools in mathematics has been a part of the curriculum since 1980. Despite this, 40 years later, students continue to use digital tools only to a small extent in mathematics (The Swedish Schools Inspectorate, 2019). This raises the question of why digital tools are today used in ways similar to 20 or 40 years ago, when most secondary school students today have ubiquitous access to digital tools. It also raises questions regarding how everyday classroom life is influenced by the presence of digital tools. These questions were crucial when I initiated my doctoral studies in 2014, and later for my work in the research project Digitalization Initiatives and Practices (DIP²) from 2017 onwards, which is a part of the research group Communication, Culture and Diversity (CCD³) at Jönköping University. However, the more data I created and analyzed, the more I realized that the one-school-for-all discourse was entwined with other discourses. The one-school-for-all discourse was entwined with the discourses circulating in policy documents, it was entwined with discourses in student interviews, and later it

¹ In this thesis I will use the term “digital tools” as a comprehensive concept for digital tools intended for learning, including both software like word processors and web browsers, and hardware, like computers, mobile phones, tablets, and devices such as headphones.

² <http://ju.se/ccd/dip>

³ <http://ju.se/ccd>

was entwined with discourses identified in classroom fieldwork. Therefore, the interest in project DIP became digitalization-of-education discourses discursively entwined with the one-school-for-all discourse.

Framed by the one-school-for-all discourse that guides the Swedish school system, project DIP focuses on agency, participation, and inclusion in technology-infused educational settings. In project DIP, an ethnographic gaze on policy documents and educational settings, foremost lower secondary schools, has resulted in the four studies upon which this thesis rests. These studies are presented in “The studies” section of this thesis. However, it is important to highlight here that the data collection for Study 2 included in this thesis was conducted *before* the initiation of project DIP. In these early years of my doctoral studies, actor-network theory, as conceptualized by Latour (1987), was the primary analytical lens. Actor-network theory plays therefore a minor part in the first two studies, Study 1 and Study 2, of this thesis. Further, the one-school-for-all perspective became highlighted in project DIP, and all data material was scrutinized with a point of departure in this new direction. These data comprise interviews with students in five schools conducted in 2015 and 2016. One of these schools has also been the setting for participatory observations. Reflections from this school make up important data in this thesis. The school will be presented in the “Secundus School” sub-section of the “Engaging the nexus of practice” section.

Purpose

The overall aim of this thesis is to illuminate how compensatory ambitions, conceptualized in the one-school-for-all discourse of the Swedish governmental strategy, enacted in 2017, to digitalize the entire school system, are framed in classroom practice. The perspective is multi-scalar: temporally, spatially, and socially. The processes cover the governmental strategy from its initiation to its implementation. In the policy process two levels, the macro and micro levels, are in focus.

At the macro level, both social actors, i.e., persons as actors (Scollon & Scollon, 2004) e.g., individuals, authorities, and school staff, and what will be conceptualized as *frozen action*, i.e., policies and documents, are focused upon, including who has the authority to shape policy and implementation processes. At the micro level, classroom agency on different hierarchical

levels is focused upon, both in teacher/student relations, and in relations among the group of students. Of special interest on the micro level is the one-school-for-all discourse, framed by identity expressions and positionings, inclusion and exclusion, and marginalization processes.

A theoretical and methodological guide in this thesis, and the four studies, is nexus analysis (Scollon & Scollon, 2004). Nexus analysis is an ethnographic approach with a point of departure in sociocultural perspectives. Scollon and Scollon (2004) consider nexus analysis to be discourse analysis. As nexus analysis is the intersection of various discourses circulating in the social action of interest, it is well suited for analyzing complex social (inter-)actions in different spatial and temporal scales.

Despite the affordances of nexus analysis as a tool for analyzing complex social actions, there are few nexus analyses conducted in educational settings (Riekki, 2016). This thesis strives to fill this gap. Following Garcia et al.'s (2018) call for research on what classroom technology and students' personal technology in the classroom means for students' identity positionings, this study strives to contribute to the knowledge of how the digitalization of educational settings influences social classroom relations, and especially identity formations and hierarchical teacher-student relations, and student-student relations.

Research questions

- Which discourses in place, discursively entwined with the one-school-for-all discourse, were circulating across time in the shaping of the Swedish digitalization strategy?
- Which discourses in place, discursively entwined with the one-school-for-all discourse and with a special focus on digital tools and classroom interaction orders, were circulating among secondary students before the enactment of the Swedish digitalization strategy?
- Which discourses in place, discursively entwined with the one-school-for-all discourse and with a special focus on issues of identity and inclusion, circulate or were circulating in secondary classrooms after the enactment and in the implementation process of the governmental digitalization strategy?

Next follows a presentation of the Research context on which this thesis rests. This section gives a brief introduction to the Swedish school system. Further,

the research context presents the one-school-for-all discourse. Discussion of the research context is concluded with an account of the governmental strategy to digitalize the Swedish school system and digitalization in a Swedish educational context. This is followed by a presentation of the theoretical approaches, the sociocultural perspective and Nexus analysis, that guide the work presented in this thesis. Included in the theoretical section is an overview of previous research that has used nexus analysis in educational settings. In the following section the methodological and analytical processes are described. This section is divided in two sub-sections: Engaging the nexus of practice and Navigating the nexus of practice. The studies upon which this thesis rests are thereafter presented with a special focus on crucial actors and discourses entwined with the one-school-for-all discourse. Study 1 comprises a critical discourse analysis of the policy documents upon which the governmental digitalization strategy rests. Study 2 is founded on interviews with secondary school students on their experiences of digital tools in formal and informal education. Study 3 presents examples of gatekeepers, including digital tools, for inclusion in educational settings. Study 4 discusses three examples of digital tools as mediating tools for inclusion, exclusion, and identity expressions in educational settings. The thesis is concluded with a synthesizing discussion of the studies in a nexus of practice.

Research context

In this section four important background topics that frame this thesis are presented. The presentation starts with an introduction to the Swedish school system. Thereafter follows a sub-section on the concept of one-school-for-all, a concept that is fundamental to the Swedish school system and one that will be further scrutinized throughout this thesis. The third sub-section introduces the governmental strategy to digitalize the Swedish school system, a strategy that is a focal point for the thesis. The final sub-section introduces digitalization in a Swedish educational context.

The Swedish school system

Swedish compulsory school spans nine years⁴. All children in Sweden attend nine-year compulsory school and most children are seven years old when they attend the first class⁵. The upper secondary school is three years for most students. Upper secondary school is optional, but almost all young people do attend.

The distribution of authority in the Swedish school system can be likened to an hourglass, with more authority distributed to the macro and micro levels, and less agency distributed to the middle, meso, level. The *formal* agency trajectory from macro level to micro level could be described as a top-down public administration chain: The European Union – The Government of Sweden – the Swedish National Agency for Education – municipal school authorities for financial distribution – local school administration – teachers – students. However, *informally* the agency trajectory is messier. It could be argued that the agency trajectory is reversed, at least at the micro level. Students (and their guardians) have gained agency at teachers' expense, something that has been much debated in Sweden.

⁴ Students in special schools attend compulsory school for 10 years.

⁵ Children start formal preschool-class at the age of six years. They have access to preschools upto then.

The macro-level actors provide the national policy documents. As a member of the European Union (EU), the nation-state of Sweden must submit to EU regulations. EU law is superior to national law. Sweden's officially recognized key competences are in line with the EU key competences (European Parliament, 2006), and a digital agenda for Europe (European Commission, 2010) translates into a digital agenda for Sweden (The Digitalization Commission, 2014). The Government of Sweden and the Government Offices have the responsibility to transfer the EU regulations into national proposed bills. To do the investigatory work, the government designates commissions like the Digitalization Commission, whose policy documents are crucial for the digitalization strategy. The government also gives directives to the Swedish National Agency for Education, which is responsible for curricula and syllabi, to incorporate new digitalization formulations. However, it is up to the teacher on the micro level to interpret curricula and syllabi. Therefore, the government authority the Swedish Schools Inspectorate (*Skolinspektionen*) ensures that individual schools are following the appropriate laws and regulations.

The meso-level actors consist of the municipality's political level and the municipality's school authorities. Important meso-level work is conducted in cooperation between the schools of the municipality under the governance of the local school authority. In other words, the meso level could be considered a nexus for local schools in the same municipality. The Swedish municipality has a high degree of authority. For instance, most of the tax on wages goes directly to the municipality, and the municipality regulates the tax rate. In other words, there is no authority level between the governmental and municipality levels in the educational field. An important task for municipal school politicians is to distribute financial funding to the local school system.

Swedish schools are publicly financed, and school fees are prohibited. The ownership of the schools is mixed, however. About three of four schools in the Swedish school system are administrated by municipalities, and one of four are non-publicly administrated, so-called independent schools, and administrated by a company board (The Swedish National Agency for Education, 2019b). Every single municipality and independent school board is a responsible authority. In 2010, there were 1092 different responsible authorities for the Swedish schools, including the 290 municipalities (The Swedish National Agency for Education, 2012). Furthermore, every school is responsible for its own activities and its own finances, and every teacher can

choose how to teach and by what means. The independent schools, as well as the publicly administrated schools, are financed by public means from the student's home municipality. The students are free to choose a school either in their home municipality or in another. This system has led to a competitive relationship between the Swedish schools, and between municipalities.

The competitive, market-like characterization of the Swedish school system goes back to the early 1990s, when several crucial educational reforms took place. Perhaps the most influential educational reform was the transfer of administrative responsibility from the governmental level to the municipal level in 1991. This reform was followed in 1992 with the independent school reform, i.e., the reform that opened the school "market" for independent schools. However, the economization of the Swedish school system could be considered to have begun in 1990, with the introduction of the *new public management* as the administrative principle for the Swedish school system. New public management was an administrative principle for schools in many developed countries since the 1980s (Selwyn, 2011). In Sweden, new public management was introduced

with the aim of rationalising the system and increasing its effectiveness. The introduction of market mechanisms such as customer choice, concurrence between schools, vouchers and accountability in the welfare system was supposed to increase the quality of the services offered, for instance, by schools. (Allodi, 2013, p. 331)

In 2021, new public management is still the administrative principle in the Swedish school system, however under increasing critical debate.

One-school-for-all

The Swedish school discourse is characterized by the role of the school as an equalizer of unequal conditions and backgrounds. To fulfill this,

the school has a compensatory task. The education should take into consideration all students' different needs, where an ambition should be to balance differences in their prerequisites. This means to organize the activity on individual, group, and school levels to give the students

opportunities to develop as far as possible according to the goals of the education.⁶ (The Swedish National Agency for Education, 2014, p. 10)

The inclusive, non-discriminatory school illustrated by the above quote from the Swedish National Agency for Education (*Skolverket*) will in this thesis be conceptualized as the *one-school-for-all* discourse. It could be argued that the one-school-for-all discourse goes back to the introduction of the nine-year comprehensive school in the 1960s; “To make education and *Bildung* equally accessible for all is firstly and lastly a social reform in the widest sense with deep influences on the long-term development of the society”⁷ (The Ministry of Education and Ecclesiastical Affairs, 1962, p. 32). The one-school-for-all perspective of the nine-year comprehensive school was both social and spatial, i.e., education would be equal irrespective of where in Sweden the school was located or if it was located in a rural or urban area (Román & Ringarp, 2016). The Swedish national curriculum stipulates that all students are provided education on equitable terms:

The Education Act stipulates that the education provided in each school form and in the recreation center should be equivalent, regardless of where in the country it is provided. National goals specify the norms for equivalence. (The Swedish National Agency for Education, 2011, p. 10)

All books are free to borrow from the school. In compulsory school, and in a majority of the upper secondary schools, the school lunch is free of charge. The school is not allowed to organize any activities that could bring the students, or their guardians, any extra costs.

The compensatory role of the school is highlighted in the fourth paragraph, first chapter of the school law of Sweden that stipulates that “An endeavor [for the school] should be to compensate for differences in the children’s and the

⁶ In original: skolan har ett kompensatoriskt uppdrag. Utbildningen ska ta hänsyn till alla elevers olika behov, där en strävan ska vara att uppväga skillnader i deras förutsättningar. Detta innebär att organisera verksamheten på individ-, grupp- och skolnivå så att eleverna får förutsättningar att utvecklas så långt som möjligt enligt utbildningens mål. (All translations, unless mentioned otherwise, have been done by me.)

⁷ In original: Att göra utbildning och bildning lika tillgängliga för alla är först och sist en social reform i vidaste mening med djupgående verkningar för samhällets utveckling på lång sikt.

student's prerequisites to benefit from their education"⁸ (SFS nr: 2010:800). The school's responsibility is to compensate for all kinds of deficits that the students might face in their lives outside school compared to other students, for instance physical or mental disabilities, not having Swedish as a primary named language, or socioeconomic circumstances.

The one-school-for-all discourse implies that all students, *irrespective of their background or other prerequisites*, will be able to partake in education on equal footing, preferably in the same classroom. However, as Östlund (2015) highlights, students with multiple disabilities, what he conceptualizes as low-incidence learners, for example, have difficulties being included in compulsory school. For students with special needs, it is important to get support from special educational professionals in the regular classroom. However, in a study by Ramberg (2017), 62 percent of the scrutinized schools say that they provide students with special needs special educational support in the regular classroom to a low or very low extent. Despite the intention to include all students in the same classroom, it is a common practice to segregate students, due to impairments like ADHD (Hjörne, 2017), deafness or hard of hearing (Bagga-Gupta, 2001, 2017a), or blindness or visual impairment (de Verdier et al., 2018).

For students with special needs, tools can act as gatekeepers for inclusion in educational settings. Diener et al. (2016) show how working with a 3D design software application can promote inclusion and social interaction for boys with ASD (Autism Spectrum Disorder). For deaf or hard of hearing students, cochlear implants facilitate participation in the mainstream classroom (Holmström & Bagga-Gupta, 2017; Holmström et al., 2015). However, as Bagga-Gupta et al. (2016) highlight in a study of technology as a mediator for access to higher education, technology itself cannot enable access to education.

The governmental digitalization strategy

Digitalization is one area where the Government of Sweden recognizes differences among students:

⁸ In original: En strävan ska vara att uppväga skillnader i barnens och elevernas förutsättningar att tillgodogöra sig utbildningen.

A study from the governmental media council shows that the general access to digital tools and the use of them among children and youngsters differs depending on gender, socioeconomic background, and other demographic variables. It is therefore urgent that all children and students are given the same opportunities to develop their digital competence.⁹ (The Government of Sweden, 2017, p. 3)

To come to terms with the one-school-for-all goal and the differences regarding the extent of digitalization in the school system were important rationales for the government of Sweden to initiate the work on a strategy for digitalization of the whole school system. The government wanted to decrease the differences between different schools, and even classrooms (The Government of Sweden, 2015), and transfer the responsibility for the digitalization of Swedish schools from the micro level of the individual school and teacher to the macro level of national responsibility, something that is recognized as a strategic challenge in a report by The Government Offices (2011).

On the macro level, the government of Sweden explicated the need for equal access to digital tools in the whole school system, and commissioned the Swedish National Agency for Education to revise curricula and syllabi to include digitalization aspects, as well as to evaluate and report the progress of educational digitalization (The Government of Sweden, 2015). The government formulated three focus areas in the digitalization strategy (The Government of Sweden, 2017):

- 1) Digital competence for all in the school system.
- 2) Equal access to and usage of digital tools for all in the school system.
- 3) Research and follow-up on the possibilities of digitalization.¹⁰

⁹ In original: En studie från Statens medieråd visar att den generella tillgången till digitala verktyg och användningen av dem bland barn och unga skiljer sig åt utifrån kön, socioekonomisk bakgrund och andra demografiska variabler. Det är därför angeläget att alla barn och elever ges samma möjligheter att utveckla sin digitala kompetens.

¹⁰ In original: 1) Digital kompetens för alla i skolväsendet, 2) Likvärdig tillgång och användning, 3) Forskning och uppföljning kring digitaliseringens möjligheter

The first two focus areas could be considered a one-school-for-all perspectives. The second focus area is a prerequisite for the first. The third focus area could be considered a guarantee for a long-term qualitative perspective on the digitalization process.

Digitalization and digital tools in Swedish educational settings

The three focus areas of the digitalization strategy could be considered what Kozma (2008) conceptualizes as strategic policies, i.e., visions of a digitalization policy outcome. However, as Kozma (2008) highlights, to be successful the strategic policy dimensions must be complemented with operational policies, e.g., infrastructure development, teacher training, technical support, and pedagogical and curricular change. As we have seen, the digitalization strategy resulted in curricular change. However, dimensions such as the infrastructure development, teacher training, and technical support are left to the individual schools' discretion.

Thus, the governmental initiative had significant effect on the individual schools. Before the implementation of the digitalization strategy, it was a common practice – not least due to there being few computers per students – to offer digital tools in special computer rooms, especially in compulsory school. Between 2015 and 2018 the student-per-computer ratio in lower secondary school decreased from 1.9 to 1.3, and the share of the lower secondary students with access to a computer of their own in school increased from 50 to 75 percent (The Swedish National Agency for Education, 2019a). Today it is normal practice that lower and upper secondary schools provide either laptop computers or tablets to their students.

To buy digital tools for students is a major financial investment for the individual school. However, it was clear that the digitalization strategy would not include any extra governmental funding (The Government of Sweden, 2017). In other words, the strategic policy was not supported with an operational policy (Kozma, 2008). Therefore, many schools had to use funding slated for textbooks and other material. Old and worn textbooks were not renewed, and the students had to use digitalized textbooks on their new digital tools. Grönlund (2017) argues that the investment in digital tools had an impact on the schools' possibility to hire teachers. The schools had to invest

both in hardware, such as computers and tablets, and teachers' professional education. This is something of which The Swedish National Agency for Education is aware (Ekström & Lycken Rüter, 2016).

Kozma (2008) suggests that private-public partnerships developed as a result of the increased expenditure incurred due to the digitalization of the school system. In Sweden, private-public partnerships are common practice in contemporary times. The massive investments in new digital tools in the wake of the digitalization strategy implementation create opportunities for EdTech (educational technology) companies to sell apps for all individual needs, and places publicly financed schools at risk of being privatized "by stealth," as Wright and Peters (2017) argue from a New Zealand perspective. Selwyn (2014) reminds us that technology "needs to be understood as a knot of social, political, economic and cultural agendas" (p. 6), and that there are reasons to be skeptical of the unnuanced discourse of digital technology in educational settings. It could be argued that the Swedish school system has been commercialized for a long time, as all material used in school, including textbooks, is provided by private companies. However, the textbooks are written by recognized authors, published by recognized publishing houses, and scrutinized by experienced teachers. The EdTech market, on the other hand, is "wilder," with many producers, and where it is harder for the individual teacher to judge the quality of the product. Even in a small country like Sweden, there are several competing "technology trade fairs" (Selwyn, 2011, p. 70), where a plethora of software and hardware companies, publishing houses, and other vendors of digital technology targeted to teachers offer their products. I have visited several of these technology trade fairs, with names like *Framtidens lärande* (*The Learning of the Future*), *Framtidens läromedel* (*The Teaching Material of the Future*), or *SETT* (*Scandinavian Education Technology Transformation*, a name borrowed from the British *Bett Fair*). In a large fair hall, the retailers from EdTech companies demonstrate, and sell, their products to teachers, school leaders, and other people responsible for the digitalization of the schools. With these fairs comes a considerable new cost for the school as the entrance fees are high and the school must pay for travel and hotel for the staff visiting the fairs. In other words, with the implementation of the digitalization strategy the inequality regarding access to digital tools decreased, but the inequality regarding other pedagogical resources remained, and even increased.

The meaning of the concept of *digitalization* is central in the digitalization-of-education discourse. However, there is no general definition of the concept. Heath (2016) distinguishes three perspectives on the concept of digitalization: digitalization of processes to organize education, digitalization of teaching and learning processes, and digitalization of the individual student's own environment. He defines digitalization of teaching as the extent of digitalization, and which tools, material, and methods are used to conduct teaching, and wants to separate *forms* of teaching from *content* of teaching. Heath (2016) highlights that the main digitalization discourse focus in Sweden has been the *form* of teaching, i.e., new teaching methods and tools, and less of the *content* of teaching, i.e., knowledge of digitalization. Heath's definition is widespread in the Swedish educational digitalization discourse, and is for instance used in a training course in leading digitalization processes by the Swedish National Agency for Education, intended for headmasters and other school administration personnel. The Digitalization Commission (2014) distinguishes between digitalization of information and digitalization of society, where the former is a transformation of information into digital forms, and the latter an increased usage of digital tools and services in a wider sense. However, the school digitalization discourse is often framed by the digitalization of information definition, and digitalization gets reduced to the purchase of digital devices (Grönlund, 2017).

In the policy discourse that frame this thesis, the concept of digital competence (Swedish *digital kompetens*) is used. The concept of digital competence is ambiguous and lacks a general and agreed-upon definition, as highlighted by Olofsson et al. (2019). Their conclusion is that the digitally competent teacher is more of an "an ideal teacher than a general teacher" (p. 14). To highlight the social or sociocultural perspective of digital competence, the concept of *digital literacy* is preferred (Jones & Hafner, 2012). Jones and Hafner (2012, p. 13) conceptualize digital literacy as

the practices of communicating, relating, thinking and 'being' associated with digital media [---] 'digital literacies' involve not just being able to 'operate' tools like computers and mobile phones, but *also* the ability to adapt the affordances and constraints of these tools to *particular* circumstances. (Italics in original)

However, as all actors we meet in this thesis use the concept of digital competence, this will be used throughout the thesis to avoid confusion. The

Government of Sweden (2017), for example, expresses a perspective on digital competence as the skill to use digital technology as well as skills to evaluate (digital) information, and skills to be a digital producer, rather than a mere digital consumer. This definition of digital competence is in line with Jones and Hafner's (2012) definition of digital literacy above.

Teaching in Sweden is dominated by plenary, whole-class, IRE¹¹ activities (Klette et al., 2018; Mehan, 1979). In the IRE classroom discourse, the students respond to the teacher's initiation, an initiation that often is founded on texts. However, the students are to a large extent directed to use digital tools, on the internet or in digitalized textbooks, for finding this information. Even more so in the contemporary Swedish schools, as many schools must buy digital tools to meet the requirements in the wake of the governmental digitalization strategy of 2017. The ubiquitous access to digital tools could affect the interaction order of the everyday classroom work. Grönlund (2017) highlights, for example, that in low performing (digitalized) schools, the teachers have abandoned an organized strategy for individual work with the result that the students lose focus.

Advocates of digital tools in education often use arguments from a pragmatic tradition of learning. According to pragmatism, and especially its most well-known representative, John Dewey, knowledge should be something useful and relevant in peoples' everyday lives (Säljö, 2015). This implies that the object of education is not to prepare for life after school – education should be useful immediately. Dewey opposed the traditional, authoritarian school, and proposed an activity pedagogy in which the children used all senses in learning. A frequently used argument from the pragmatic tradition is that digital tools are used in the outside world, both in working life after school, and in the students' lives outside of school. Pragmatic arguments are also used as a rationale for using drilling games in educational settings. As the students are considered “digital natives” (while their teachers are considered “digital immigrants”) and like to use digital tools and play computer games outside school, the school should channel that interest to increase interest in learning (cf. Prensky, 2006).

In the ongoing discourse in Sweden on problems with digital tools in education, neuro-scientific perspectives are often used. The point of departure

¹¹ (teacher) Initiative – (student) Response – (teacher) Evaluation

of the neuro-scientific perspective on learning is the brain's functioning and the biological foundation of thinking, learning, and language (Säljö, 2015). The concept of memory is central to the neuro-scientific tradition on learning. The human brain is not developed for all information that digital tools serve us with. This can for instance be noted in an ongoing debate regarding whether mobile phones should be banned in schools, and the Government of Sweden is preparing such a ban (Ekström & Svanstorp, 2019; Heath, 2016). The following typical quote from an op-ed in a daily paper illustrates this issue:

Brain research shows that concentration is crucial for acquiring learning and that's why mobile phones are so problematic. In an environment where mobile phones constantly draw our attention, the students' focus gets constantly interrupted. Of course it will influence how much one can learn. (Nylander, 2018)¹²

The neuro-scientific point of departure is also used by influential actors in the contemporary school debate. The magazine for one of the two teachers' unions problematizes the forming of learning spaces designed for the digitalized classroom:

Today, actors want to build open and creative school environments with a focus on creativity, individual responsibility, and cooperation in big groups.

- To a large extent, these new physical learning environments, looking like this, make learning harder for all students. If we look at all the contemporary neuro-scientific research about how the brain processes information and how we learn, it indicates that these learning environments are directly harmful, says Malin Walsö.¹³ (Wallin, 2019)

¹² In original: Hjärnforskning visar att koncentration är avgörande för att inlärnin ska ske och det är därför mobiler i klassrummet är så problematiska. I en miljö där mobiler ständigt drar till sig vår uppmärksamhet avbryts eleverna ständigt i tanken. Det påverkar naturligtvis hur mycket man lär sig.

¹³ In original: I dag vill aktörerna gärna bygga öppna och kreativa skolmiljöer som har mycket fokus på kreativitet, det egna ansvaret och samverkan i stora grupper. – I mångt och mycket försvårar de nya fysiska lärmiljöerna, som ser ut på det här sättet, inlärnin gen för alla elever. Så man har missat något viktigt där. Tittar vi på all den neurovetenskapliga forskning som kommer i dag kring hur hjärnan processar

However, the neuro-scientific perspective on learning is not guiding this thesis. From a sociocultural perspective, digital tools are considered one of many tools mediating learning and communication. The sociocultural perspective on learning is presented in the following section.

information och hur vi lär oss så pekar allt på att de lärmiljöerna är direkt skadliga, säger Malin Valsö.

Theoretical approaches

In this section two theoretical approaches used in the thesis are presented—the *sociocultural perspective* and *nexus analysis*. There are strong arguments not to separate them into two subsections, as nexus analysis is influenced by, and could be considered an aspect of, the sociocultural perspective. But to make a clear-cut presentation they will be presented separately here.

A sociocultural perspective

The sociocultural point of departure is that human beings are social creatures (e.g. Säljö, 2005). All human activity, including learning as Säljö (2014) highlights, is conducted in interaction with others. Vygotsky (1978)¹⁴ argues that learning is a result of interaction, not a result of imitation; “if the teacher were to solve a problem in higher mathematics, the child would not be able to understand the solution no matter how many times she imitated it” (Vygotsky, 1978, p. 88). Hence, learning, from a sociocultural perspective, is envisaged as a dimension of both formal and informal settings, as the learner interacts with others in both settings. Säljö (2014) stresses that informal learning often is more convincing than formal. He argues that the dominant idea in the formal educational system, that knowledge has the form of rules and algorithms, is insufficient. One must decide when a set of knowledge is relevant, productive, and works in different situations. Traditional school has a reproductive view of learning. Säljö (2010, p. 58) argues that “To know something in this niche of society has been, and sometimes still is, a matter of being able to give back what has been presented: terms, definitions, grammatical rules, text passages.” In the modern world, school has lost control over information (Säljö, 2010). Learning takes place in many different arenas, not least online. In informal learning settings like online computer games and social networks, agency is more equally distributed in interaction between peers. Gynne and Bagga-Gupta (2015) highlight the challenge for modern formal education, to both uphold the task to educate students for the formal, canonical, text-centered,

¹⁴ Säljö (2015) categorizes Vygotsky as a representative for the sociocultural tradition, while Jarvis et al. (2003) categorizes him as a representative for the cognitivist tradition.

traditional classroom, and the future, multimodal world. In a study of two Swedish upper secondary schools, Svärden Åberg and Åkerfeldt (2017) highlight how linguistic modalities were rewarded in multimodal assignments. Holmström and Bagga-Gupta (2017, p. 212) show how multi-modal communication, as a part of contemporary discourse, conflicts with a traditional formal education:

Their [symbolic representations] deployment is generally considered irregular in school or paper-pen writing tasks. In other words, languaging in virtual settings has created a whole range of conventions that is not particularly welcomed in formal writing at institutional learning spaces.

From a sociocultural perspective, learning takes place in cooperation between the individual and the collective (Säljö, 2014). The focus of a sociocultural analysis is human action, and the unit of analysis is mediated action (Wertsch, 1998). Action is understood both as external and internal action. From a sociocultural perspective, action is mediated by mediational means, or, with a term Wertsch (1998) interchangeably uses, cultural tools. The mediational means offer affordances to solve a problem or perform a task. Action can be mediated by physical means, artifacts, and intellectual mediational means.

The most important intellectual mediational means is language. In this thesis the concept of language is not restricted to named languages, e.g., Swedish or English, but widened to consider all expressions of meaning negotiations, i.e., communication. “A performatory stance [on communication] implies that linguistic units, including modality-related resources, constitute meaning-making tools” (Bagga-Gupta, 2017b, p. 107). To avoid the connotation of named languages, e.g., Swedish or English, inherent in the concept of language, the concept of *languaging* will be used in this thesis. In the concept of languaging, or ways-of-being-with-words, vocal – spoken words, sighs, laughs etc. – as well as non-vocal semiotic resources – gestures, signs, clothes, haircuts etc. – are considered (Bagga-Gupta, 2017a; Linell, 2009). Languaging is understood “as the dynamic and social use of different linguistic features for creating and negotiating meaning” (Gynne & Bagga-Gupta, 2015, p. 510).

Language and use of language are essential for identity positioning (cf. Bucholtz & Hall, 2005). The classroom is an arena for relational identity construction, like every other interactional arena. Identity should be

understood “in terms of performance, as *action*” (Bagga-Gupta et al., 2017, p. 6, italics in original). Drawing on sociocultural perspectives, identity is constructed in interaction on a relational foundation, or as Scollon (2001, p. 141) frames identity: “any action positions the social actor in relationship to others who are engaged in the practice”. Bucholtz and Hall (2005, p. 586) define identity as “the social positioning of self and other.” In a similar way, Esteban-Guitart and Moll (2014, p. 37) note that:

identity refers to an internalized and externalized set of meaning, practices, and distributed resources embedded in ways of life and contexts for learning. In an important way, a person’s self can be viewed as a dynamic organization of various resources, socially, historically, and culturally created.

People shape their identities with artifacts and other semiotic resources. When the school provides the students with laptops or tablets for use both in school and at home, these tools become *personalized*. When the digital tools become personalized, they also become tools for identity positioning (Garcia et al., 2018). These resources become *identitized* (Esteban-Guitart & Moll, 2014). However, semiotic-resources-in-communication are resources for *linguaging*. In other words, digital tools are used as tools for languaging. In an illuminating example, Esteban-Guitart and Moll (2014) show how the computer is among a young woman’s identity-marking artifacts. In a study of 17-year-old Finnish-Swedish bilingual speakers in a bilingual Finnish school, Rusk (2019) argues that mobile technology is a way for multilingual students to bring their identity into the situated classroom. Bjørgen and Erstad (2015) argue that digital practices in school facilitate students’ understanding of their identities as learners. In a systematic research review, Smith et al. (2020) highlight how multimodal classroom work facilitates identity expression by emergent bilingual learners. Even younger students mediate identity through screens, which Gynne (2017) highlights in a study of grade 5 and 6 students in a Swedish-Finnish bilingual profile compulsory school.

By introducing the term *situated learning*, Lave and Wenger (1991) present a fruitful perspective on sociocultural learning. With the concept of *situated* they highlight that all knowledge is generated within a context; “even so-called general knowledge only has power in specific circumstances” (Lave & Wenger, 1991, p. 33). Their point of departure is the medieval guild system, with an apprentice and master relationship. To become a master, the

apprentice moves from a peripheral position in the community, and in interaction with the more capable peers becomes more skilled and gains more legitimacy within the community, a process conceptualized as *legitimate peripheral participation*.

By this we mean to draw attention to the point that learners inevitably participate in communities of practitioners and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community. (Lave & Wenger, 1991, p. 29)

To learn is to become a member of a *community of practice*, which, they argue, is the opposite of formal school education. Lave and Wenger (1991) highlight the importance of informal learning as, they argue, apprentices seem to learn more from other apprentices than from the asymmetric master/apprentice relationship.

Scollon (2001) criticizes the concept of “community of practice” from the point of view that the community consists of *persons*, not practices. However, the community of practice plays an important role in the *nexus of practice*, a concept that will be presented in the following sub-section, in that

the community of practice is how the nexus of practice is objectified in discourse. We act within our nexus of practice but to the extent we begin to make these nexus explicit, formal, analytical, and above all objective and reified, we do so as communities of practice. (Scollon, 2001, p. 155)

Thus, as we will see below, the students in a classroom setting are the objects, or rather subjects, in a community of practices. These practices are intersecting in the nexus of practice.

One dimension of being in the center of the community is the ability to control the cultural tools, to have *agency*. From a sociocultural perspective the concept of agency is relational in social, not individual, interaction, or in Wertsch et al. (1993, p. 337) words, agency “extends beyond the skin.” Wertsch et al. (1993, p. 343) outline two ways agency extends beyond the skin: “(1) Agency may be attributable to groups rather than individuals; and (2) agency is an attribute of the individual(s)-operating-with-mediational-means.” In this thesis, agency is conceptualized as a power relation between actors, i.e., which actor has the authority over another actors, or is subjugated

under another actor or other actors. For example, as we saw above, Lave and Wenger (1991) highlight that apprentices often learn from other apprentices rather than from the master, which increases the degree of agency of the apprentice, and decreases the degree of agency of the (formal) community center.

The introduction of new technology in the classroom has impact on who has the classroom control and agency. Holmström and Bagga-Gupta (2017) show how the teachers have agency in the classroom with a student with cochlear implant (CI), by controlling the CI remote control. As Asplund et al. (2018) highlight, digital tools redistribute classroom agency – when students can use their mobile phones their classroom agency increases in relation to the teacher. However, the student with mobile phone access gains agency over her peers without mobile phones, and the mobile phone becomes a tool of both inclusion and exclusion. The agency shift from teacher to student in the digital-tool-infused classroom is highlighted in Bergström et al. (2017). They argue that some teachers under scrutiny integrate the digital tools in a present classroom context, which is textbook centered, and furnished with student desks placed in rows. In these classrooms, the teacher has the control. However, some teachers redesign their teaching with a point of departure in the digital tools and refurnish the classroom to facilitate discussions and group work. In these classrooms, Bergström et al. (2017) argue, the teacher redistributes some of the classroom control to the students.

The redistribution of agency is one reason that the introduction of new cultural tools can meet resistance. Wertsch (1998) raises the potential problem of introducing new cultural tools as the usage of cultural tools could be a result of traditions and habits rather than the superiority of the tool. The introduction of a new cultural tool can cause an imbalance in the organization of the mediated action, which can render changes in other elements. This can make people question the new cultural tool and ask themselves if it is the agent or the tool that solves the problem. It is in other words considered “cheating” to use the new tool. One interviewed student in the studies upon which this thesis rests recounted how the students must delete all personal files, including essays and notes, on their school-provided iPads before a test to prevent cheating.

The notion of *perspective* in the concept of *sociocultural perspective* is important. It is a perspective, a way of seeing the unit of analysis. Hereafter

will the analytical framework nexus analysis be presented. Nexus analysis takes the sociocultural perspective as one point of departure for analyzing comprehensive social actions.

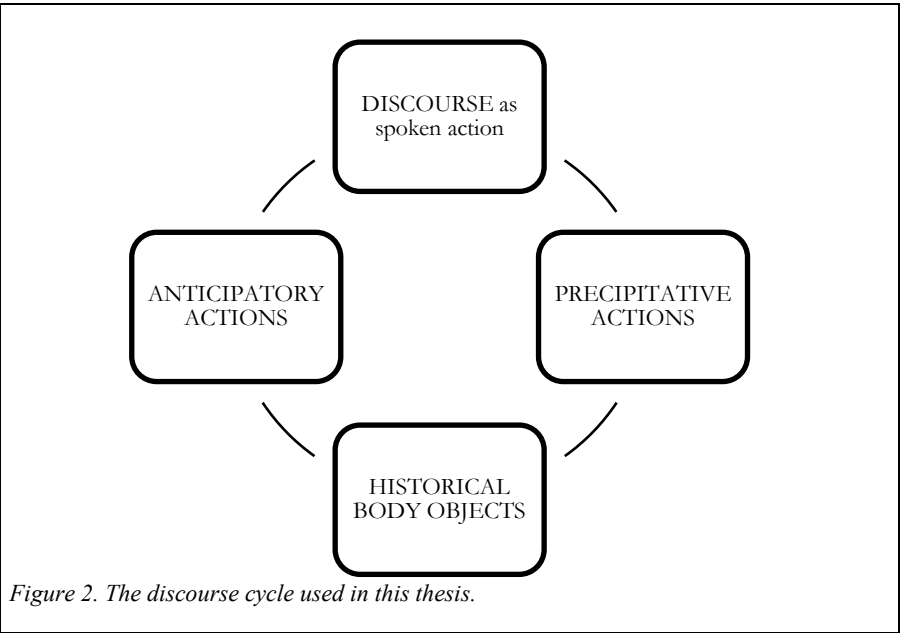
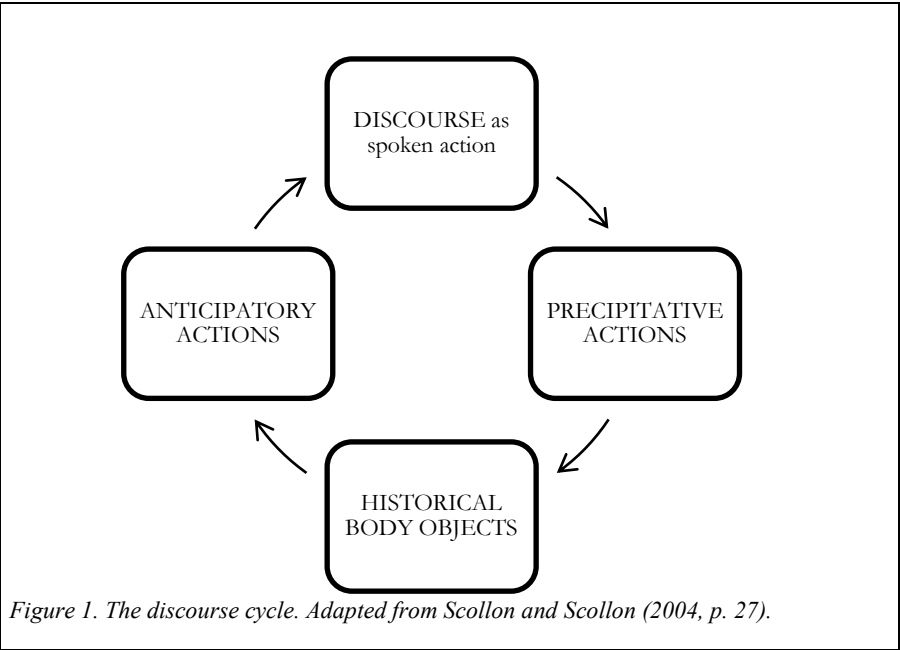
Nexus analysis

Nexus analysis is an analytical framework developed by Ron and Suzie Wong Scollon, and the conceptualization of nexus analysis in this thesis is highly dependent on their work *Nexus Analysis. Discourse and the emerging Internet* (2004). It is arguable that nexus analysis should be considered a theoretical or methodological point of departure. In this thesis, nexus analysis is considered both theoretical and a methodological guideline for a comprehensive analysis of complex data material. Nexus analysis is multidisciplinary in its nature, and “draws on many different linguistic and anthropological fields: Critical Discourse Analysis, Ethnography of Communication, social psychology, interactional sociolinguistics and linguistic anthropology” (Lane, 2014). A sociocultural perspective is an important backdrop for nexus analysis as well. Scollon and Scollon (2004, p. x, italics in original) have the ambition of “doing ethnographic discourse analysis which we are calling *nexus analysis*, the study of the semiotic cycles of people, objects, and discourses in and through moments of socio-cultural importance.” In other words, nexus analysis is considered a method for analyzing a complex set of ethnographic data, which is analyzed with a sociocultural gaze on social interaction. As will be accounted for in detail later, the ethnographic data in this thesis consist of policy documents, newspaper articles, audio and video recordings, field notes, and classroom artifacts collected in different spaces and over considerable time. Nexus analysis offers a methodological strategy for a comprehensive analysis of social (inter-)action over different temporal and spatial scales.

Nexus analysis is an approach to discourse analysis (Scollon & Scollon, 2004). The concept of discourse includes all communication. Scollon and Scollon (2004) identify two levels of discourses. At the first level Scollon and Scollon (2004, p. 2) define discourse as “the use of language in social interaction.” At the second level they define discourse in line with Gee (1999) as “Discourse with a capital D” for situations where humans integrate verbal and non-verbal modalities. This second level of discourse is also conceptualized by Blommaert (2004, p. 3) as “all forms of meaningful semiotic human activity seen in connection with social, cultural, and historical

patterns and developments of use.” The two levels of discourse are discursively entwined. However, “there is rarely any confusion between the two levels” (Scollon and Scollon, 2004, p. 4f). Scollon (2001, p. 146) highlights that discourse is closely related to identity; “Central to a Discourse is the concern for the production of identities, both those established by and within a Discourse and the identities of those produced as others.” The definition of the concept of the level 2 discourse is close to the definition of languaging, as it is conceptualized above. To highlight the communication-in-(inter)action aspects of the concept of level 2 discourse, the concept of languaging could be interchangeably used. However, as the concept of discourse is well established in nexus analysis, this concept will be used in the framework of nexus analysis.

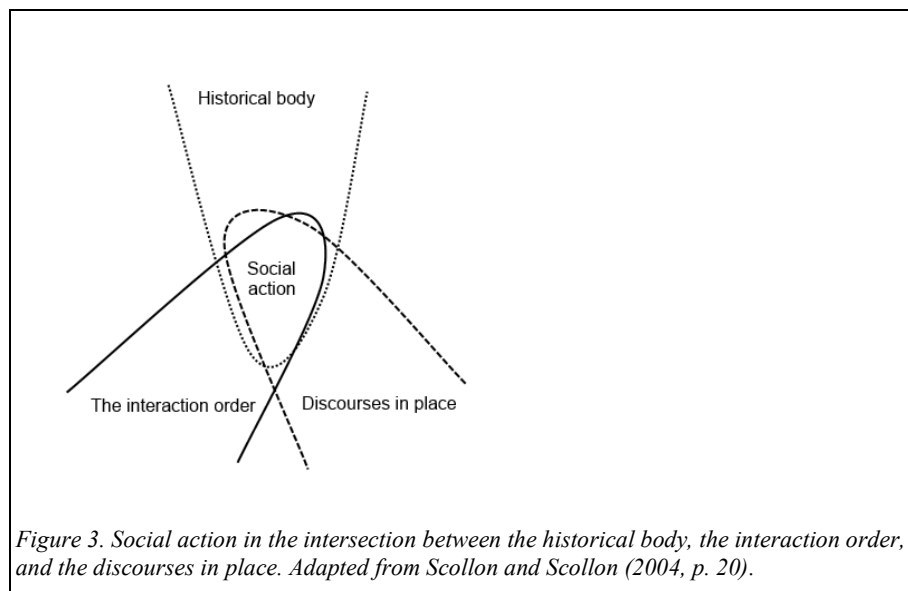
With the concept of *discourses in place*, Scollon and Scollon (2004, p. 13) highlight that all “interaction is accomplished at some real, material place in the world.” However, discourses are situated both in place and *time* – they have a past, present, and a future. The past of the discourses influences the present, and the present influences actions and anticipations of the future. This temporal transformation is conceptualized by Scollon and Scollon (2004) as *the discourse cycle*, or interchangeably *the semiotic cycle*. The concept of the semiotic cycle highlights that there is more than first-level discourse involved. However, in line with the definition of discourse-as-semiotic-signs, the concept of discourse cycle will be used throughout this thesis. The discourses in place are the discourse cycles in the current scene (or at a specific point in time), or the current/previous action. The discourse cycle is illustrated in Figure 1.



In Figure 1, the four units of the discourse cycle—Discourse as spoken action, Precipitative actions, Historical body objects, and Anticipatory actions are sequential, one unit following the other. However, to highlight the

discursively entwined nature of the four units of the discourse cycle, and to avoid seeing the four units of the discourse cycle as strictly sequential, a slightly modified model will be used in this thesis (Figure 2).

The unit of analysis in nexus analysis, social action, is the nexus of the discourses in place, interaction order, and historical bodies of *social actors*, i.e., “the *persons* [...] taking action with the aid of mediational means” (Scollon & Scollon, 2004, p. 14, my italics). Figure 3 sets out the three elements of social action. The *historical body*, a concept borrowed from Nishida (1958), takes into account the experiences of the participating social actors. The historical body accumulates our social actions and makes us act in accordance with earlier experiences; “It is the practices in and through which we act without a second thought that most clearly reveal our habitus – the historical-body, as Nishida (1958) puts it, of our lives” (Scollon, 2001, p. 153).



The *interaction order* is the order in which (inter-)action takes place. Inspired by Goffman (1983), nexus analysis explicates the interaction order as “any of the many possible social arrangements by which we form relationships” (Scollon & Scollon, 2004, p. 13). Hult (2015) argues that what may be relevant to the interaction order, or relations among actors, are norms of interaction in a specific setting, expectations about social roles/positions, central vs. peripheral participants and modalities. These features have relevance to textual worlds as well as face-to-face meetings. Hult (2015) further argues that the interaction order functions as a bridge between the historical body and the

discourses in place, where the historical body is the individual scale and discourses in place is the universal scale.

Nexus analysis is centered on three activities (Scollon and Scollon, 2004): engaging the nexus of practice, navigating the nexus of practice, and changing the nexus of practice. This first¹⁵ activity, *engaging the nexus of practice*, involves identifying the crucial actors, their historical bodies, interaction orders, and discourses in place, and identifying the research questions (Scollon & Scollon, 2004). This is in line with the ethnographic research process, i.e., not starting with a research question. “You can’t specify the questions you’re going to ask when you move into a community; you don’t know how to ask questions yet” (Agar, 2008, p. 120). In the nexus analysis, new crucial actors and discourses emerge, i.e., new engagement of practice, hence leading to new research questions.

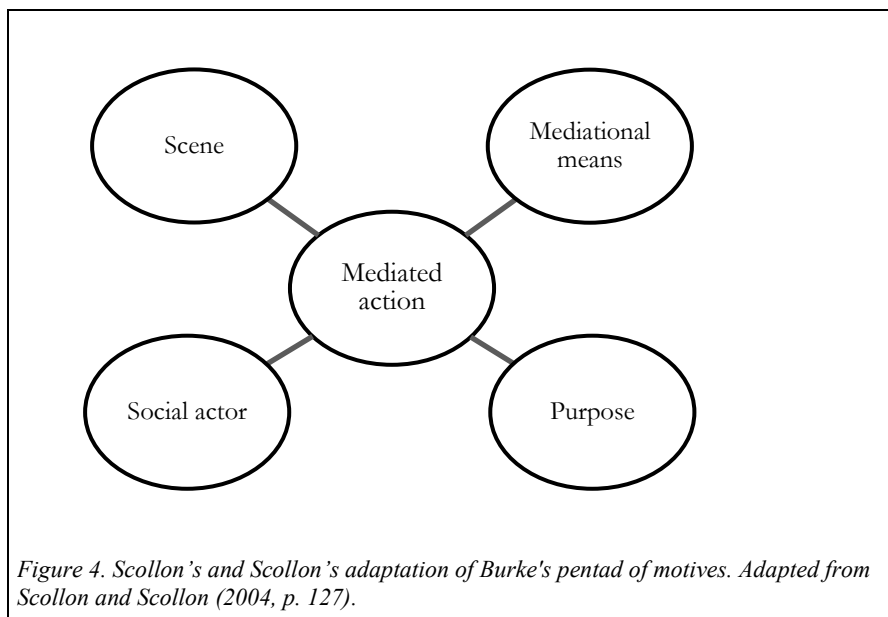
Navigating the nexus of practice constitutes the most extensive activity of a nexus analysis. Action can here be considered a moment in time and space where the discourses in place, the historical body, and the interaction order intersect. In navigating the nexus of practice, two activities are undertaken: *mapping* and *circumferencing* the discourse cycles (Scollon & Scollon, 2004, Figure 2). Mapping “is just to sketch out a map of the many semiotic or discourse cycles that are circulating through the moment of social action” (Scollon & Scollon, 2004, p. 87). In the circumferencing process, the character of each mapped discourse cycle is examined (Scollon & Scollon, 2004). To explain the individual discourses, Scollon and Scollon (2004) use an adaptation of Burke’s (1945) pentad of motives. The adapted pentad consists of the following five items:

- *Scene*. Answers to the question of *where* was it done?
- *Social actor*. Answers to the question of *who* did it?
- *Mediational means*. Answers to the question of *how* did the social actor do it?
- *Purpose*. Answers to the question of *why* did the social actor do it?

¹⁵ It is important to have in mind that the three activities of a nexus analysis are *not* considered to be sequential. Scollon and Scollon (2004) argue that a nexus analysis ends both in engaging *and* changing the nexus of practice. The three activities run parallel and are entwined in time and space. However, to avoid confusion the three activities engaging, navigating, and changing the nexus of practice will be numbered the first, the second, and the third activity in this thesis.

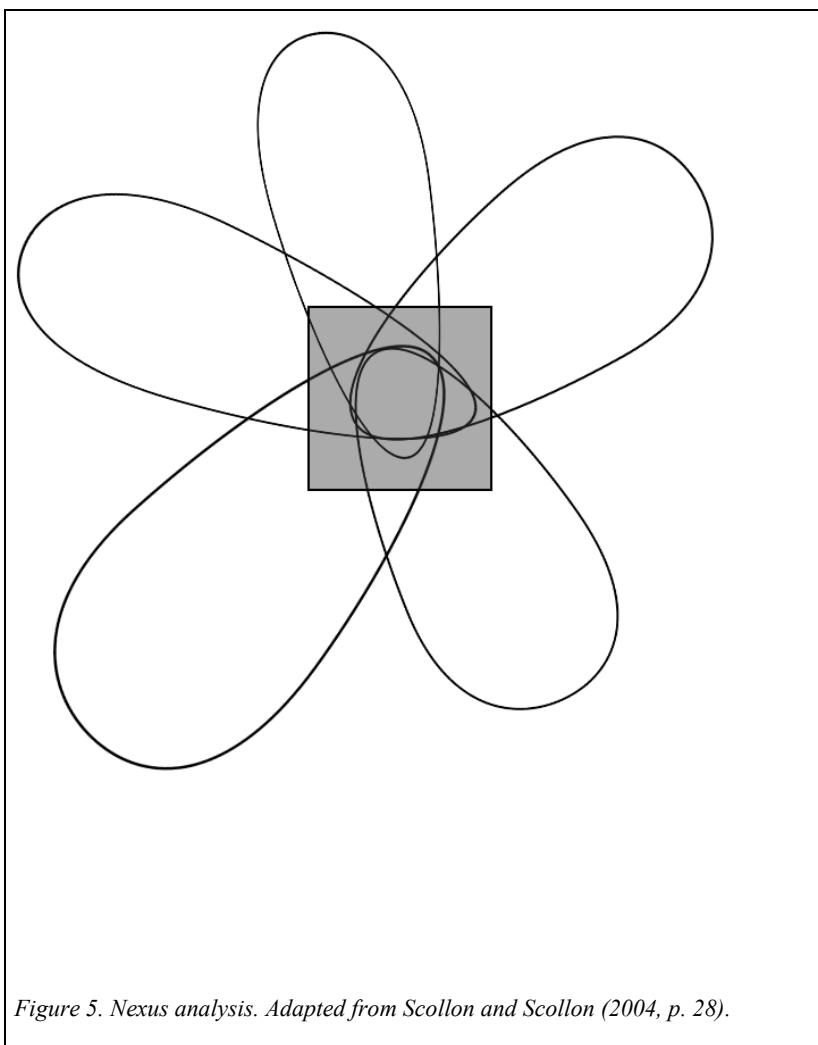
- *Mediated action.* Answers to the question of *what* was done?

There is no hierarchical relationship between the five explanatory positions; they are all equally important to explain the discourse under scrutiny. In this thesis the explanatory positions for the crucial discourse cycles are accounted for in the “Discourses in place” section. The pentad of motives is illustrated in Figure 4.



The temporal and spatial scales of the discourse cycles could differ vastly. It could be micro-scale moments of parts of lessons in a classroom or macro-level policy processes with timespans of years and affecting the whole school system. Scollon and Scollon (2004, p. 8) highlight that “nexus analysis is a way to strategize unifying these two different levels of analysis.” In other words, nexus analysis is especially suitable for analyzing human activities across different scales; spatial, temporal, and social (Hult, 2015). It is at the intersection of the circulating discourses that the nexus analysis takes place (Figure 5). The intersection is conceptualized as a *nexus of practice* (Scollon, 2001; Scollon & Scollon, 2004). Scollon (2001, p. 142) defines the nexus of practice as a point where “a number of social practices intersect, never perfectly, never in any finalized matrix or latticework of regular patterns, but

as a network which itself is the basis of the identities we produce and claim through our social actions.”



The third activity of the nexus analysis, *changing the nexus of practice*, starts with the researcher themselves. All ethnographers have a personal history, a historical body, that they carry. Wolcott (2008) highlights that the ethnographer does not have to pretend objectivity but can reveal and admit subjectivity and the impact of personal experience. A nexus analysis always takes its point of departure to be the researcher’s values and experiences (Scollon & Scollon, 2004). However, the first change in a nexus analysis is “the change of positions and identities of the researcher” (Scollon & Scollon,

2004, p. 81). As a practicing teacher my gaze on and interpretation of the settings where interviews and field work were conducted were colored by my historical body. Paradoxically, I had an *etic* (Wolcott, 2008), i.e., outsider's, perspective on the schools. Paradoxical in the sense that these were well known settings, but they were not my settings. The first activity of the nexus analysis, engaging the nexus of practice, involves the trajectory from an etic perspective to an *emic* (Wolcott, 2008), i.e., insider's, perspective.

However, interaction is a mutual process. Given that the analyst takes active part in the social action under scrutiny, it is inevitable that the research process influences the social action. Therefore, the last activity in a nexus analysis consists of changing the nexus of practice (Scollon & Scollon, 2004).

In their account of nexus analysis, Scollon and Scollon (2004) use higher education as one important point of departure. The backdrop for using higher education as an explanatory setting is that they both worked as teachers and were conducting ethnographic studies at a university in Alaska at the time of their writing. Therefore, they could compare education before and after digitalization of education processes. This is of interest in this thesis as their ethnographic studies were conducted at the dawn of internet and computer-mediated distance education. Scollon and Scollon (2004) conceptualize the pre-digitalized classroom as a *traditional classroom*. The interaction order of the traditional classroom is conceptualized, with a terminology borrowed from Foucault, as a *panopticon interaction order*. In a panopticon classroom the “teacher owns the room space; has wide latitude of using front third of the space” (Scollon & Scollon, 2004, p. 43). The classroom front is dominated by the whiteboard. The teacher is physically separated from the students, who are sitting close together, turned toward the teacher. In a traditional classroom interaction order, the teacher is the performer, and the students are spectators. The classroom events are controlled by the teacher, including the entrance to, and exit from, the classroom. Utterances are monologic, and the teacher dominates the talking space and distributes the word to the students, one at the time, in concert with the IRE interaction order. The teacher is framed as having the strongest agency and being the one who controls the classroom. They control access to the classroom and the flow of events in it. A traditional classroom discourse circulates on teacher-controlled topics. These topics are curricula based, and other topics are excluded. Written texts – in textbooks, from papers, or on whiteboards – are preferred modalities. Assessments are conducted with written tests and quizzes. As Wertsch (1998) highlights, the

position of authority lies with the one who controls the initiation and the evaluation, i.e., the teacher. The traditional classroom discourse is integrated in students' and teachers' historical bodies, which is in line with the concept of *the grammar of schooling*, which highlights the constancy of "the regular structures and rules that organize the work of instruction" (Tyack & Tobin, 1994, p. 454). The traditional classroom is also in line with Säljö's (2010) conceptualization of the traditional school.

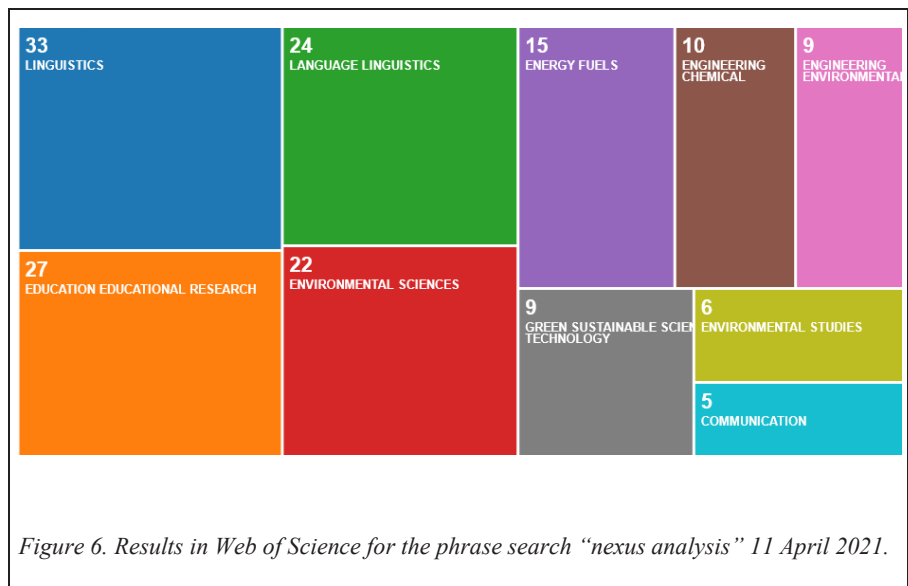
The technology-mediated classroom, as described by Scollon and Scollon (2004), is a classroom where technology is an integrated part of teaching and learning. Classroom topics could emerge both from teachers and from students and are not necessarily curricula centered. In the technology-mediated classroom, the students often have more experience than the teacher, which distributes agency from teacher to students. However, it is important to remember that the background of the technology-mediated classroom, as Scollon and Scollon (2004) describe it, is university students enrolled in distance studies, which is something different compared to the Swedish digitalization-of-education discourse. Nevertheless, they suggest that it is the digital tools *per se* that transform the traditional classroom to a technology-mediated classroom. Distance studies is not allowed in Swedish lower secondary school¹⁶. Therefore, the features of the technology-mediated classroom have not been evident even in Secundus School, which has been a school where the students have had ubiquitous access to digital tools for several years. All DIP classroom discourses and interaction orders follow the outline of the traditional classroom discourse.

As we have seen in this section, the emergence of nexus analysis is closely connected with educational settings. Education and teaching are complex phenomena, with many discourses in place, and spanning over different spatial and temporal spaces, which makes nexus analysis a suitable analytical and methodological tool. However, despite this background nexus analysis has not become a common framework for educational research, which will be highlighted in the next section.

¹⁶ However, during the Corona pandemic distance studies have been allowed in Swedish lower secondary schools.

Nexus analysis in educational settings

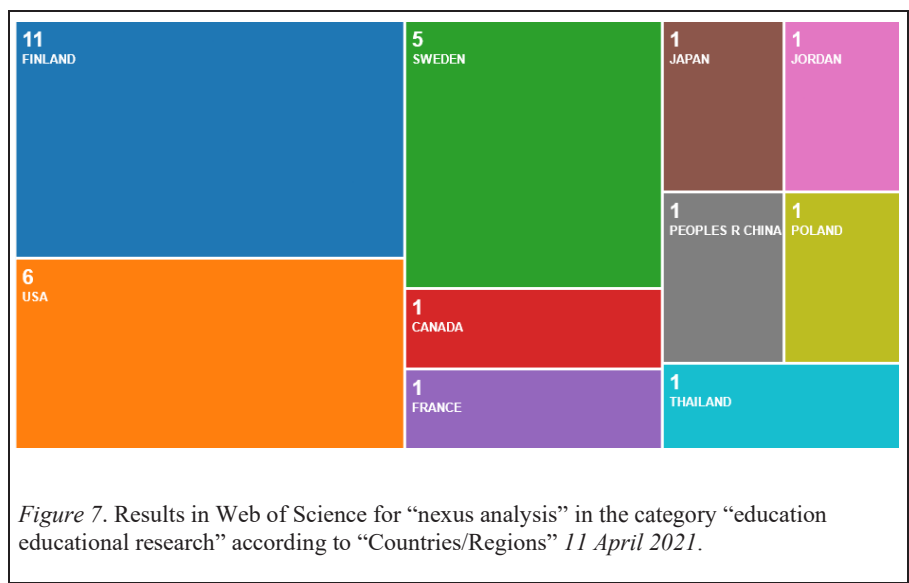
In the previous section it was highlighted how nexus analysis, with its roots in both sociocultural perspectives and ethnography, is suitable for analyzing complex societal phenomena. Nexus analysis has been used as an analytical framework in different contexts, e.g., policy studies (Hult, 2015; Hult & Hornberger, 2016; Källkvist & Hult, 2016; Scollon, 2008) and communication studies (Hult, 2017; Lane, 2010; Pietikäinen et al., 2011; Tapio, 2013). With discourse analysis as a backdrop for nexus analysis, the framework is used for analyzing various types of social communication datasets, such as newspaper archival material (Hult & Pietikäinen, 2014), public signs (Pietikäinen et al., 2011), TV documentary transcripts (Lassen, 2008), interview recordings (Lane, 2010), and policy documents (Scollon, 2008). However, there are not many examples of nexus analyses in educational settings, especially in compulsory and upper secondary school.



A search for the phrase “nexus analysis” in Web of Science¹⁷ conducted on 11 April 2021 resulted in 119 hits. The most common research category in this search is “linguistics” with 33 results, followed by “education educational research” with 27 results (Figure 6). Of these results, 13 were overlapping, i.e., the results were categorized both as “linguistics” and “education

¹⁷ <https://www.webofknowledge.com>

educational research.” A search in the education-oriented article database the Education Resource Information Center (ERIC)¹⁸ for “nexus analysis” conducted 11 April 2021 gave 24 results. Six of these could be considered nexus analyses conducted in compulsory school environments.



Of the 27 educational nexus analyses listed in Web of Science as of 11 April 2021, almost one third were conducted in Finland. Only five studies in this result list are conducted in Sweden (Figure 7). Of these five studies, one is Almén and Bagga-Gupta (2019), i.e., Study 1 in this thesis, and one is Almén et al. (2020), i.e., Study 2 in this thesis. One of the other three, Gynne et al. (2016), is conducted in a compulsory school setting. Web of Science does not index theses. However, the Swedish scientific publication database SwePub¹⁹ indexes theses published in Sweden. A search for the phrase “nexus analysis” gives three results. Two of these results could be categorized as educational theses. Christensson (2021) has conducted a discourse analysis on professional identity by student teachers, i.e., in a higher education setting. In her thesis, Rosén (2013) conducted a study on identity positioning among participants in a Swedish language course for immigrants. Rosén (2013),

¹⁸ <https://eric.ed.gov/>
¹⁹ <http://swepub.kb.se/>

together with some Finnish theses²⁰ (Riekkö, 2016; Strömmer, 2017; Tapio, 2013) could all be categorized as linguistic educational theses. In other words, there are few, especially non-linguistic, theses taking advantage of the affordances offered by nexus analysis for understanding complex social (inter-)actions in educational settings. This thesis strives to fill this gap.

²⁰ A search for “nexus analysis” in the database of the Finnish National Library (<https://kansalliskirjasto.finna.fi/Search/Advanced>) gives two individual results (Tapio, 2016; Strömmer, 2017).

Methodology and analysis process

Following Scollon and Scollon (2004, p. 21), the ethnographic focus in this thesis is on social action, i.e., “try[ing] to understand how people take actions of various kinds and what are the constraints or the affordances of the mediational means (language, technology, etc.) by which they act.” In other words, nexus analysis is ethnography with a theoretical point of departure in social action, not social groupings *per se*; “In this it departs to a considerable extent from traditional ethnography in anthropology or sociology” (Scollon & Scollon, 2004, p. 13). However, to study social action requires, in line with traditional ethnographic studies, rich data.

The fieldwork is a way of seeing, and is fundamental in any ethnography (Wolcott, 2008). The perspective in ethnography is holistic (Agar, 2008), and therefore several methods of data collection are used. Hammersley and Atkinson (2007) argue that there is no standard definition of an ethnography but recognize five common features. An ethnography, according to Hammersley and Atkinson (2007):

- Involves fieldwork.
- Uses several data collection methods.
- Has a relatively unstructured data collection, no final research design from the beginning, and the interpretation is done during the fieldwork.
- Follows a few cases or groups to be able to get in-depth understandings.
- Has an analysis that involves interpretation of meaning, function, and consequences of human action and institutional practices.

This study has been inspired by these features of a traditional ethnography. To engage the nexus of practice, i.e., identify crucial actors and discourses, policy documents, video and audio recordings, field notes, photos, and artifacts like timetables, worksheets, and laboratory material have been analyzed. The analysis process for this data material is presented in this section.

From a sociocultural perspective, culture is the set of ideas, values, knowledge, and other resources that we acquire in interaction with other humans (Säljö, 2014). Traditionally, ethnography is the study of a culture (Frank, 1999). Today, however, ethnographies are conducted in familiar

settings, like schools (Wolcott, 2008). Spradley (1980) considers ethnology as a methodologic tool for scrutinizing complex societal phenomena. This is in line with the ethnographic roots of nexus analysis; “A nexus analysis is a form of ethnography that takes social action as the theoretical center of study, not any *a priori* social group, class, tribe, or culture” (Scollon & Scollon, 2004, p. 13). This conceptualization of ethnography is adopted throughout this thesis.

The focus of the studies presented here is human (inter-)action. However, it is important to emphasize that this includes myself; “A nexus analysis arises from the values and the position of the researcher; this is the crucial starting point” (Scollon & Scollon, 2004, p. 78). These values changed throughout my studies as I was influenced and affected by people I met in various situations, or documents I read. In other words, new influences became parts of my historical body. However, this is a mutual process, as my presence influenced and affected other people. Wolcott (2008) stresses that traditionally, studies of schools have involved non-participant observations, like being a fly on a wall. The non-participant perspective is opposite to the ethnographic, and sociocultural, perspective. A nexus analysis inevitably requires the researcher to be a part of social actions. This is in line with Agar (2008), who argues that a lot of traditional ethnography can be equated with being a part of the group under scrutiny. In a similar way Spradley (1980) argues that in an ethnography, the ethnographer is the student, while those individuals or groups in focus are the teachers. This interaction and mutual influence between actors, including myself, is what Scollon and Scollon (2004) conceptualize as changing the nexus of practice.

To understand the driving forces leading to the governmental digitalization strategy, a discourse study of the policy documents that formed the strategy was conducted. The discourse study is accounted for in the forthcoming section, Study 1. To understand students’ experiences of and views on digitalization and classroom agency relations, an interview study was conducted in late 2015 and Spring 2016. These interviews, which are accounted for in the forthcoming section Study 2, were mainly conducted in schools other than Secundus School in the ethnography. The forthcoming sections Studies 3 and 4 present studies based on the fieldwork conducted primarily in Secundus School classrooms, but also outside in hallways, the students’ dining hall, staffrooms, school yard, etc. As a part of her supervisory role and involvement in project DIP, my head supervisor conducted fieldwork with me in Secundus School.

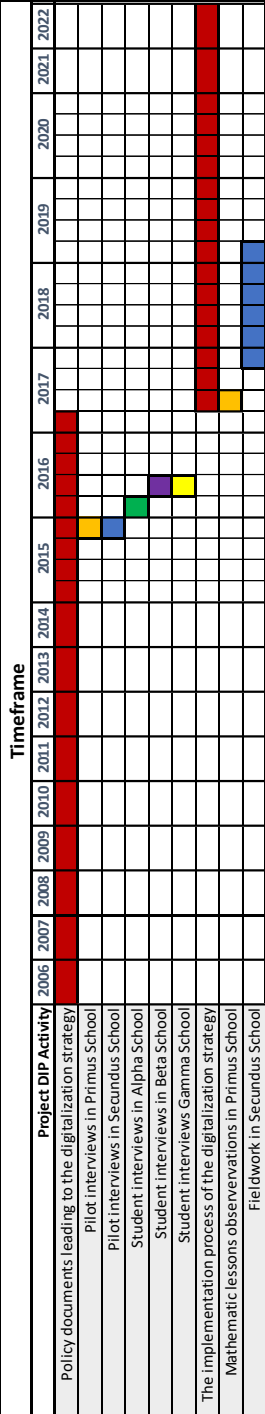


Figure 8. Ethnographic timeframe.

The participation of my head supervisor in the fieldwork *in situ* at Secundus School is one example of the involvement of other researchers in the data analyzing process. The data material, whether policy documents, interviews, or fieldwork, has been analyzed in dialogue with my supervisors, and in particular with my co-authors. Involving other researchers is essential for the validity of the interpretation of ethnographic data material (Corsaro, 1982).

In the following sub-sections, the ethnographic work that contributed to the understanding of the discourses in place will be accounted for, as will the historical bodies of the actors, and the interaction orders. Figure 8 accounts for the timeframe of the ethnography. The earliest analyzed policy document is from 2006, and the latest from 2017. The pilot interviews in Primus School and Secundus School were conducted in 2015 and the interviews in Alpha School, Beta School, and Gamma School were conducted in 2016. The implementation process of the digitalization strategy spans from 2017 to 2022. The field work in Secundus School was conducted from 2017 to 2019.

However, it is important to have in mind that a nexus analysis is not a linear process. As we have seen, the nexus analysis *per se* is the intersection of circulating discourses in the nexus of practice (cf. Figure 5). These circulating discourses are situated in different, and sometimes overlapping, spatial and temporal spaces, and the importance of one discourse in place can be identified in the light of another. Engaging, navigating, and changing the nexus of practice are recurring and entwined activities.

Hereafter follows a presentation of how the three activities of the nexus analysis have been conducted. To bring some structure to the presentation, the engaging and navigation activities are divided into three sub-sections: student interviews, Secundus School, and policy documents. It is important though to highlight that these three sub-sections are not three separate settings. They are all entwined in time and space and in the analytical process influence each other. After the account for engaging, navigating, and changing the nexus of practice, the ethical considerations that guided this study will be accounted for.

Engaging the nexus of practice

Student interviews

In the first activity of a nexus analysis, engaging the nexus of practice, crucial actors and discourses are identified and engaged with. To digitalize the school system involves many actors and discourse cycles. However, the most crucial actors in the educational system are the students. To identify discourses circulating among students engaged in the Swedish school system, semi-structured interviews with grade 8 secondary school students were conducted in 2015 and 2016 (Figure 8).

The informal ethnographic interview (Agar, 2008) is not based on written-down questions. Rather the interviewer develops a strategy for asking questions. As the ethnographer doesn't know enough, they take the role of the interested other rather than interrogator. Hammersley and Atkinson (2007) argue that interviews can be everything from spontaneous meetings to structured interviews. Wolcott (2008) identifies ten different types of ethnographic interviews. Two of these types are used in this ethnography: *casual conversation* and *semi-structured interviews*. Semi-structured interviews are the main data material in Study 2.

The casual conversations, both at the schools in the interview study and Secundus School, often took place in the staffroom. Both teachers and administrators gather in the staffroom, and the casual conversations here gave both background information about the staff and a sense of the general atmosphere in the schools. To participate in, and listen to, the discussions and meetings in the staffroom also helps distinguish both formal and informal leaders (Seidman, 2013). In Secundus School, the casual conversations often took place in the classrooms where the teachers were interviewed. Topics in focus could be the conducted lesson, or a general view on a certain topic. The casual conversations, documented in the field notes, gave important data for the engagement of the nexus as both historical bodies and discourses in place were identified.

Getting access to a school for interviews cannot be taken for granted. The most important gatekeeper in the Swedish school is the headmaster, who formally is responsible for who will have access to the school. The headmaster is what Seidman (2013) calls an absolute legitimate gatekeeper. It was hard to find

schools where I could have access to students and talk with them. I had written to several headmasters in different municipalities without getting any response. Finally, my previous supervisor became the gatekeeper as he called the head of the local school authority in a medium-sized municipality²¹, who at that moment was in a meeting with all headmasters of the lower secondary schools in the municipality. The local headmasters granted me access to their schools. The headmaster asked the class teachers for the grade 8 students to find students who were willing to participate in the study. Since the interviewed students were younger than 18 years old, all participating students were required to sign and make available an agreement of consent signed by themselves and their parents or guardians (see “Appendix 1. Agreements of consent”). The gatekeeping process is a striking example of the built-in autonomy of the individual actors in the Swedish public sector. The local school authority leader asked the headmasters in the municipality if I could interview students. The headmasters asked the grade 8 class teachers, who asked the students. The last link in the chain makes the final decision.

The main corpus of the interview material is the semi-structured interviews (Kvale, 2009). Thirty-one interviews with grade 8 students in five different schools were conducted in the autumn of 2015 (Primus School, and Secundus School) and the spring of 2016 (Alpha School, Beta School, and Gamma School). Engaging the nexus of practice is the first activity in the nexus analysis. However, this first activity is not taken in a void. To write an interview guide requires a starting point, and this starting point was the result from the 2012 Programme for International Student Assessment (PISA) survey that Swedish students performed better the less they used digital tools for education (OECD, 2015). This result raised the question of how digital tools were used in Swedish educational settings. Was it the digital tools *per se* or was it the usage of the digital tools that caused the decrease in the PISA performance? These questions were the starting point for the design of the pilot interviews.

The eight pilot interviews (four girls and four boys) were conducted with the intention of identifying prominent actors and discourses in circulation which

²¹ Statistics Sweden (*Statistiska Centralbyrån*, the official statistical authority in Sweden) considers municipalities with less than 10 000 inhabitants as small, municipalities with 10 000 to 59 999 inhabitants as medium-sized, and municipalities with more than 60 000 inhabitants as large.

could be further scrutinized in the full-scale interviews. These interviews were conducted in two different schools (four in Primus School, and four in Secundus School). These two schools are the only lower secondary schools in this small, rural municipality. I was familiar with the two pilot interview schools from my master studies, and my ethnographic gaze was colored by earlier visits and teacher interviews.

The transcriptions of the pilot interviews were read and reread by me in search of discourses in place. Prominent student discourses in the pilot interviews were:

- The students use several digital tools.
- Writing different kinds of texts and searching for information are two main reasons for using digital tools in schools.
- The students prefer computers for writing and mobile phones for searching for information or learning new words in foreign languages.
- Digital tools make studies more organized.
- Computers are used in a computer room.
- Sometimes the students have to use their mobile phones, as there is a shortage of printed books.
- Students' usage of digital tools in classrooms is contingent upon their teachers' preferences.
- Students who attend a class where everyone has access to an iPad report using the iPads primarily in school. These iPads seem to have substituted for computers and mobile phones for schoolwork both inside and outside school.

These discourses were a starting point for formulating the interview guide for the 23 following interviews. Later, the pilot interviews also confirmed interaction orders and discourses circulating in the full-scale interviews.

In the design of the interview study, the primary question asked was: What experiences do lower secondary school students have of using digital tools within the framework of their schooling? More specifically, the study attempts to illuminate the following issues:

- Which digital (literacy) tools do lower secondary students account for using in their educational discourse?
- In what ways are these tools used in the course of classroom work?
- Who has agency in the use of digital (literacy) tools?

- What opinions do students have of using digital (literacy) tools in school settings in the 21st century?

After the pilot interviews, 23 full-scale interviews (11 girls and 12 boys) were conducted. These interviews were conducted in three different schools (eight in Alpha School, eight in Beta School, and seven in Gamma School). These three schools are the only lower secondary schools in the municipality.

All interviews were audio recorded and transcribed. The transcriptions were made by me shortly after the interviews were conducted. This procedure was important, as one interview can identify discourses and interaction orders to follow up in upcoming interviews. The length of the interviews varied from 10 minutes in the shortest pilot interview to 31 minutes in the longest main interview²². The boys were especially taciturn. 10 hours and 38 minutes were recorded in total. 252 pages of transcription were written. In the transcription process all utterances and longer pauses are accounted for.

The interview situation is somewhat special in this ethnography. Agar (2008) has witnessed that he sometimes needs up to three months in the field to be accepted. In the interview sessions I visited Alpha School, Beta School, and Gamma School. At each school I spent two days interviewing students. This gave very little time to get to know the schools and develop a rapport with the teachers and students. However, this is not unusual when interview data is generated at the start of a project, when the researcher is not acquainted with the field settings or participants. This is also in line with the conceptualization of ethnography in Scollon and Scollon (2004). The interviewer has a short encounter with the interviewee, and a short time to build what Seidman (2013, p. 98) calls an “I - Thou” relationship. The interviews opened in a formal way, where I presented myself and the study, and asked for the agreement of consent. I also explained that the interviews would be audio recorded with two different devices as an insurance against technical failures. The interviewee was once again informed that they could withdraw at any time without further questions, and that the data material would be shared only with my supervisor. After this formal introduction, the interview started, and the recording began. This means that the first minutes of each meeting with the interviewed students are not recorded and hence not analyzed. However, this formal

²² A detailed description of the interviews is accounted for in Almén et al. (2019)

introduction is important to develop an appropriate rapport with the interviewee (Seidman, 2013), and is in line with the ethical framings.

All interviews were transcribed verbatim. In the transcription process I listened, re-listened, and then wrote down the utterance. The transcriptions are not as detailed as is the practice in a conversation analysis due to the volume of the data (Kvale, 2009). However, longer pauses are noted and the linguistic features, e.g., local linguistic variants, are retained. The transcriptions were read, re-read, and recurring discourses were color-coded (Kvale, 2009; Seidman, 2013). These data were created in 2016 (see Figure 8). However, the data were analyzed after the initiation of the fieldwork when my head supervisor and co-supervisor became co-analysts as part of navigating the nexus of practice.

Interviewing is a part of ethnography. Therefore, it is not possible to separate interviewing from analyzing, as Seidman (2013) suggests. The interview context is important. Is the school urban or rural? How was I received? What was the atmosphere in the staffroom? What was the atmosphere in the students' common areas, like corridors or dining hall? What was the interest from the school administration? All these questions are entwined in the analysis of the interview data material and give clues to identify circulating discourses in place and interaction orders. Furthermore, the fieldwork in Secundus School provided in-depth layers of data that formed a backdrop to revisiting the interview dataset in 2018.

Secundus School

In 2018, I did not just revisit the data interview material; I revisited Secundus School where the second set of pilot interviews was conducted. The purpose of the recurring visits to Secundus School over a time span of four semesters (see Figure 8) was to identify crucial actors and discourses in place *in situ*.

Secundus School is a nine-year comprehensive compulsory school, located in a small rural municipality in the southern part of Sweden. Approximately 300 students from the age of about seven years old to about sixteen years old attend the school. About 150 of the students attend grade 7 to grade 9, lower secondary school. This lower secondary school is one of two in the municipality. However, Secundus School is special as since 2012 it has been a one-to-one (or 1:1) school, i.e., every student has ubiquitous access to a

laptop computer or a tablet, at school and often at home. In the first year of my visits to the school, every lower secondary student has ubiquitous access to an iPad tablet. The one-to-one iPad project started in 2012 and lasted until the spring semester in 2018; thereafter the secondary students were provided with a laptop computer. The one-to-one project of 2012 is accounted for in Almén (2013). Before the implementation of the governmental digitalization strategy, one-to-one projects were quite unusual in Swedish compulsory schools. That Secundus School was a one-to-one school, while the other lower secondary school in the municipality, Primus School, was not, highlights the independence of and differences between schools in Sweden.

In the planning process, I considered which group I would follow. The two main candidates were either a group of students or a group of teachers. To follow a group of students would have the advantage of studying the usage of digital devices in all subjects. In Sweden, secondary school teachers are in charge of either a specific subject area or a specific class with a group of students. Teachers in primary school are normally responsible for a group of students. The class has a home classroom, and the teachers, who often are organized in teams around the class, come to that classroom. This means that the implementation of the digitalization strategy is a responsibility shared among a group of teachers with different subject areas. In lower secondary school, it is more common that the teachers are grouped by their subject area. By following a class, a more comprehensive picture of the school and a deeper understanding of the students' everyday classroom life would emerge. Therefore, I decided to follow a group of students.

Swedish schools could be considered rather open to outside visitors. However, in line with the interviews two years earlier, I needed gatekeepers to facilitate field studies in Secundus School. The importance of gatekeepers is strikingly described by Agar (2008). As the visits to the school would continue for four semesters, acceptance from both staff and students was very important. The head of the local school authority as well as the headmasters in the municipality where Secundus School is situated played an important role as gatekeepers to the municipality's lower secondary schools. However, the headmaster is gatekeeper to the school. The teachers are gatekeepers to the class and the classrooms. The headmaster mediated contact with one of the school's head teachers (Swedish *förstelärare*), who was class teacher in one of the two grade 7 classes and acted as a gatekeeper to the class. However, since the students were under 18 years old, I needed both their and their

parents' or guardians' consent to video record the lessons (see "Appendix 1. Agreements of consent"). Hence, the research project was presented both at a parents' meeting and during the students' class time²³. Following the class's timetable, I contacted all teachers I would meet to get their consent for me to attend and video record their lessons. However, a problem arose by the first lesson. In Secundus School, the class I followed has a parallel class and, in some lessons, the two classes were mixed. Only students and parents/guardians in the focused class had given their consent to participate. Therefore, some lessons were not video recorded. This was the case in the subjects Swedish (where the students were split between what is termed Swedish as a first language and Swedish as a second language), foreign language (where the students were split between German, French, and Spanish), and handicraft (where the students were split between wood handicraft and sewing handicraft). When the class was split, I chose to follow the groups assigned to the subjects Swedish, German, and sewing handicraft. Later on, during the fieldwork, the students and their parents or guardians in the parallel class gave their consent to participate.

When I first visited the school, the students in focus were attending grade 7. The students brought their school-provided iPads to all lessons, except for sports and handicraft, and they brought the iPads home after school. However, in grade 8, the students were provided with laptop computers due to the governmental digitalization strategy. In other words, the students were using a new primary digital tool in grade 8. The rationales for changing the primary digital tool were that it was considered easier to write texts on a laptop keyboard, and that the office programs (primarily word processor and presentation program) in use were better adapted to a Microsoft Windows environment. Information of the backdrop of the digitalization process came from informal discussions with teachers in Secundus School and meetings with representatives for the school administration and the local school authorities. This kind of information is important for identifying discourses in place in the navigation activity of the nexus analysis. The transition from iPad to laptop was quite smooth. However, the students and teachers often highlighted that they missed some iPad features like the portability of the iPad,

²³ Class time is 40 minutes scheduled time in which the students meet their class teacher.

and it was considered easier to use the iPad for photographing and video recording.

Approximately 20 students, a slightly larger proportion being boys, were members of the focused class. The atmosphere in the class was welcoming, and when I first met the class, they showed curiosity and interest. I had access to their timetable and followed the class the whole school day. I was also well received by the staff. The school receptionist provided me with a key to the classrooms. The head teacher I met helped me to find the right classroom. The staffroom is an important place (Hammersley & Atkinson, 2007). At every visit I was well received in the staffroom. The staff was helpful, and an important source of data. Crucial actors, discourses in place, and historical bodies were all identified in my meetings with the staff, or when I listened to discussions between staff members. In this small school both informal and formal meetings were held in the staffroom, and I was always welcomed to attend.

The importance of video recordings as sources for identifying discourses in place, interaction orders, and, if the recorded sound had good enough quality, historical bodies, cannot be underestimated. Some lessons were video recorded by two cameras to cover as much as possible of the classroom space. However, in most of the lessons only one camera was used. The camera/s were mounted on tripod/s. To use a tripod makes the researcher more of an observer than a camera operator (Heath et al., 2010). The researcher can take notes, and unexpected events are caught on film. The weakness, however, with using a tripod is that the camera angle is fixed (see Figure 9). The video camera/s recorded the sounds in the classroom. This is a disadvantage, as it sometimes was hard to distinguish which student said what. In the lessons where two researchers were present in the classroom, the video camera sound uptake was completed with an MP3 audio recorder. However, from the point of departure of the nexus analysis in most cases it is not important *which* student is involved in the discourse in place or has a historical body, the importance lies in the fact that the discourses in place and historical bodies are identified.

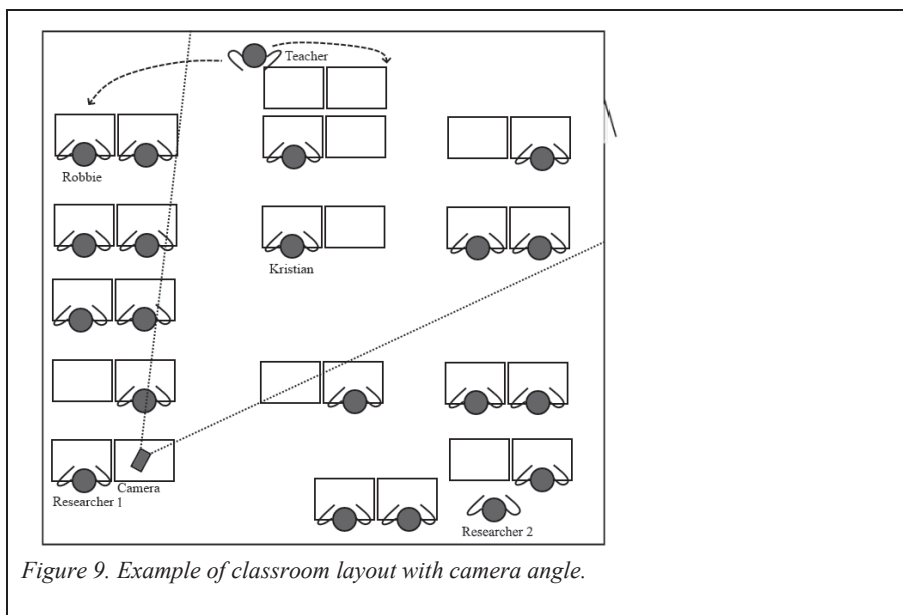


Figure 9. Example of classroom layout with camera angle.

The video material only covers lesson time, not time between lessons. Apart from the lessons where students from the two parallel classes were mixed, I chose not to video record the sports lessons for the privacy of the students. The video data material comprises 11 hours and 20 minutes of recorded lessons (Table 1).

Grade	Subject	Length (hh:mm)	Comment
7	Math	00:50	
7	Physics	01:05	
7	History	01:00	
7	Handicraft	00:55	
7	Swedish	00:55	
7	Math	01:00	
7	Physics	00:35	Due to technical problems the first 35 minutes were not recorded.
7	German	00:55	
8	German	01:00	
8	History	01:10	

8	Physics	00:50	
8	Math	01:05	

Table 1. Overview of the video recorded lessons.

To learn to know a culture is to draw conclusions from fieldwork and participant observations (Spradley, 1980). Participant observations are first-hand experiences in natural settings (Wolcott, 2008). However, traditionally the ethnographer had to rely on field notes and, later, on audio recordings. Video recordings offer the chance to make ethnography transparent and sharable (Heath et al., 2010).

Video material becomes data when it is *analyzed*, a working process Norris (2019) conceptualizes as working in a data-driven way. Engaging the nexus of practice in the video material began with a review of the complete video data corpus. However, in the nexus analysis process, engaging the nexus of practice began in real-time in the classroom and with the fieldnotes.

Fieldnotes are considered an essential part of an ethnography (Agar, 2008). Spradley (1980) argues that fieldnotes are the foremost part of the ethnographic data material, superior to recordings, photos, artifacts, and other data material. However, Agar (2008, p. 161) thinks that fieldnotes are “the most overrated thing since Edsel.” He acknowledges fieldnotes as *working notes*, notes for the memory. In the ethnography in focus, the use of fieldnotes is close to Agar’s (2008) definition. The fieldnotes play an important role for remembering parents’ meetings, meetings and occasional interviews with the classes, and the teachers. All classroom layouts are sketched in the fieldnotes. The fieldnotes completed the video recorded lessons and substituted the video recording when video recording was not possible. Discourses in place and interaction orders were identified or confirmed in the review of the fieldnotes.

Classroom artifacts are important mediational means for identifying classroom discourses, and, not least, classroom interaction orders. In the classrooms I collected and documented artifacts like work sheets, tests, and printed instructions. A printed instruction or work sheet communicates something about everyday classroom life discourses. An important artifact is the students’ timetable, which could be considered a frozen action (Norris, 2004) ruling the interaction order of the class. Some artifacts were not possible to take from their spatial position. In natural sciences for example, the students were conducting laboratory experiments. Two physics experiments are

documented, one on electricity and one on lenses. These laboratory setups are photo documented. Other artifacts were placed on the classroom walls. The artifacts that could not be brought were photo documented with a mobile phone camera. In those occasions where two researchers were present, both used their mobile phones for taking photos.

Policy documents

So far, the identified crucial actors have been acting in local settings like a school or at the local school authorities, i.e., on a *micro*-level scale. However, the digitalization strategy is a governmental enactment on the *macro* level. The micro-level interaction has been studied *in situ*, in schools and conference rooms. This is not possible with the macro-level (inter-)actions. We do not have access to the policy processes. However, we have access to the results, or the products, of the policy processes—the policy documents.

Analyzing policy processes is a case where a traditional ethnography is not applicable for a discourse analysis (Scollon, 2008). As Scollon (2008) highlights, document analysis is an efficient method to create a more complex understanding of policy processes. In the nation-state of Sweden this is truer than in most other nations, as the Constitution of Sweden stipulates that all documents written or archived by an authority, apart from explicitly secret documents, shall be publicly available. Therefore, it is possible to trace and study the chain of policy documents that lead to political decisions like the governmental digitalization strategy. The corpus of policy documents includes governmental decrees, governmental reports, governmental commissions, commission reports, curricula, syllabi, and statistical reports.

Policy documents could be considered *frozen actions*, i.e., actions “entailed in material objects” (Norris, 2004, p. 11). Policy documents mediate policy actions. As Selwyn (2011, p. 57) highlights, “The discursive role of policy refers to the meanings, values and beliefs that lie behind” policy documents. In other words, their historical bodies. As we have seen, discourses have an historical past and an anticipatory future. Considering the frozen character of policy documents, they are fixed in time. However, policy documents have a history, and they evoke anticipation of the future. To navigate the nexus of frozen actions is to identify discourses with historical bodies frozen in other policy documents. The policy documents anticipate implementation processes; in other words, the policy documents are links in chains of policy

documents. In the navigating activity of the nexus analysis, discourses *in* the policy documents and references *between* policy documents were identified. The policy document *Commission to Propose National IT Strategies for the School System* (The Government of Sweden, 2015) was chosen to be the starting point of the document chain. This document is considered a key incident (Erickson, 1977), i.e., a “particularly salient moment with respect to the nexus of practice, and a specific action within it” (Hult, 2015, p. 223). The rationale for choosing The Government of Sweden (2015) as the key incident is that this document spurred the Swedish National Agency for Education to revise the curricula and syllabi in line with the digitalization strategy. In this document, references lead to earlier policy documents which were scrutinized in the same way. The temporal backward chaining led to the document by the European Parliament (2006), where digital literacy was officially considered a European key competence.

Navigating the nexus of practice

In the second and most extensive activity of the nexus analysis, navigating the nexus of practice, the discourses in place are mapped. This could be considered the activity where the main analytical work is done. To navigate the nexus of practice is to scrutinize and analyze the data material. However, once again is it important to highlight that this work can shed light on new crucial actors and discourses not identified before, and thus could be considered part of engaging the nexus of practice.

Student interviews

Interview data consist of participant accounts of their everyday lives and social actions. Such data make it possible to map the discourses. In the interview data material, the mapping and circumference of the discourse cycles involved searching for patterns in the color-coded transcriptions. In settings where the ethnographer cannot participate, they have to rely on interviews (Spradley, 1980). Interviews could be considered proof of the interviewees’ perspectives (Hammersley & Atkinson, 2007). In other words, the interviews give access to discourses circulating among the interviewees as well as their historical bodies as the students often talked about their lived experiences of almost ten years in the Swedish school system. The interviews

also give insight to interaction orders in the interviewees' life-worlds. Two of my supervisors participated in the discourse-mapping process, the process of which is described in detail in Almén et al. (2020).

Secundus School

The holistic perspective of the nexus analysis is highlighted in the analytical process where the navigation of the nexus of practice in Secundus School is entwined with the navigation of the nexus of practice in other data, e.g., the interviews. Further, navigating the nexus of practice of the video material is entwined with engaging the nexus analysis. As the ethnographic research questions are developed during the ethnographic process (Agar, 2008; Hammersley & Atkinson, 2007), an inductive approach (Derry et al., 2010) guided the analysis. This is in line with nexus analysis, where the research questions are developed in the engaging the nexus of practice activity of the nexus analysis (Scollon & Scollon, 2004). In the navigating activity of the nexus analysis the search for what Derry et al. (2010) call *events* in the video material were the focus. These events, from a few seconds of length to a couple of minutes, were thoroughly scrutinized in accordance with methods borrowed from conversation analysis (CA; for example, Mondada, 2018; Sacks, 1995, 2004; Schegloff, 1987). The events were analyzed in detail, sometimes frame by frame. The conversation was transcribed following transcription conventions from Jefferson (2004), and crucial multimodal events were noted and depicted. By the close reading of an event offered in CA, it is possible to identify the characteristics of the discourses in place, i.e., circumferencing, and to identify interaction orders. Furthermore, analysis of the discourses in place gives clues to the actors' historical bodies.

Policy documents

The mapping of the discourses in place in the policy documents under scrutiny is conducted in accordance with Public Consultative Discourse Analysis (PCDA). An objective with PCDA is to illuminate the possible actions with the document (Scollon, 2008). However, this is not enough.

The question is: what action is being taken by what social actor in a concrete material place in the world at a specific time and how is the

document or text (or any other mediational means) used by the social actor as a tool for taking that action? (Scollon, 2008, p. 15)

The policy documents were analyzed according to the PCDA process. Scollon (2008) highlights six features of the policy document for identifying discourses and participants:

- *Participation*. Who the participants behind the document are, and their rules for participation.
- *Agency*. The degree of agency of actor/s considered the document's author/s.
- *Lexicogrammar*. The language used from a lexicogrammar point of departure.
- *Argumentation*. The (rhetorical) arguments used.
- *Genres*. The genres used in the document.
- *Modes*. The modes used in the document. Scollon (2008) uses the concept of "mode" when describing visual, embodied, etc. semiotic signs and reserves the concept of "modality" for linguistic analysis.

These six features are framed in five analytical dimensions for analyzing the document in focus:

- *Function of the document*. The function (legal, juridical, technical etc.) of the document.
- *Framing of the document*. The meta-communicative function of the document, i.e., an indication of how to interpret the message.
- *Document design*. The layout, modes, etc. of the document.
- *Production/reception (reader/writer) positions*. Scollon (2008) identifies three production roles: The *Principal* (the actor taking responsibility for the document), the *Author* (the actor who actually writes the document), and the *Animator* (the producer of the document). Further, Scollon (2008) identifies four reception positions of the policy document: the *Principal* (the actor responsible for reading and/or responding to the document), the *Interpreter* (the actor providing the meaning of the document), the *Handler* (provides the document to the principal or the interpreter), and the *Bystander or spectator* (passive seer or reader).
- *Interdiscursivity in the document*. One or more discourses is embedded in another discourse.

After the initial reading in the navigating activity of the nexus analysis, each selected policy document was analyzed in accordance with the five analytical dimensions. The documents were read and reread, and a mapping process of the analytical features was undertaken to uncover circulating discourses, interaction order, and historical bodies. In the analysis process of policy documents, which is considered frozen action (Norris, 2004), references to the documents are important parts of their historical bodies.

Changing the nexus of practice

As we have seen above, the first to change in the nexus analysis is the analyst. However, “the nexus analysis is through and through both a discourse analysis and a motive analysis which seeks to *change the nexus of practice*” (Scollon & Scollon, 2004, p. 9, italics in original).

The last activity of the nexus analysis, changing the nexus of practice, is a meta-activity; Scollon and Scollon ask, “What actions can you take as a participant-analyst in this nexus of practice that will transform discourses into actions and actions into new discourses and practices?” (Scollon & Scollon, 2004, p. 178). As discourses are *circulating*, anticipatory actions will lead to new discourses, and as the analyst is a part of the nexus analysis, the nexus analysis in itself will propel new discourses. In ethnographic fieldwork, there is evidence especially of how the teachers’ digitalization discourses have been affected by my presence. On several occasions, teachers excused themselves for not having digitalized their teaching more. I suspect that there were occasions where the teacher introduced digitalized moments in their teaching because of my presence. The students’ actions were more affected by the video recordings. At every lesson they displayed, most often subtly, that they were aware of the video cameras following them.

On the meso level, I have had recurring interaction with local school authorities in the municipality where the visited school is located. There was a direct intervention to get interview access.

Many discourses and actions are hidden to the ethnographer. I do not know anything about the discourses and (inter-)actions when I was not present. What did the headmaster say to the teachers? What did the teachers say to their students? What did the teachers say to each other?

Ethical considerations

Project DIP fieldwork and research have adhered to the ethical guidelines of the Swedish Research Council (2002). These guidelines call attention to four requirements:

- *Requirement of information.* The participants in the study shall be informed of the purpose of the study. They shall also be informed that partaking is optional, and that they at any time can leave the study without further questions.
- *Requirement of consent.* The participants are involved in the study of their free will, and they give their consent to participate. If the participants are under the age of 15 their parents or guardians must give their consent as well.
- *Requirement of confidentiality.* All information about the participants will be treated with confidence and the personal information about the participants will be stored in such a way that no one unauthorized could retrieve the information.
- *Requirement of usage.* The information about the participants is only allowed to be used for scientific purposes.

To fulfill the requirement of information all participating students and their parents or guardians were informed of the purpose of the study in a letter included in the agreement of consent (see “Appendix 1. Agreements of consent”). The students in Secundus School were also orally informed in school. This information was repeated at the beginning of the second school year of the study. Their parents or guardians were informed at a parents’ meeting.

The requirement of consent was fulfilled in several ways. All students in the interviews and the students in Secundus School and their parents or guardians signed an agreement of consent. One student did not want to be video recorded, and care was taken to always have this student outside the camera angle (see Figure 9). The size of the school makes it complicated to follow just one class. As is noted above, the class of focus has a parallel class, and students from both classes often have lessons together. This means that it is not enough to get permission from students and parents or guardians from just one class to conduct fieldwork wherein video and audio recordings are conducted, which became obvious during the field work. Therefore, some lessons have been video and audio recorded, and during some lessons only

research notes and photos have been taken. In the second year, students, parents, or guardians in the parallel class at Secundus School granted their consent as well. However, to come to a group of students and their parents or guardians with an agreement of consent is to position myself as an outsider, i.e., what Mondada (2014) calls an etic way to treat ethical problems.

During the second year of fieldwork in Secundus School, some students expressed an unwillingness or reluctance to be video recorded. After some discussion, the problem was solved by positioning the camera with a dead angle, and students who did not want to be a part of the video recordings were free to seat themselves outside that angle (Figure 9). This solution is in line with an emic way to treat the ethical problem, i.e., an insider way where the participants themselves are part of the solution (Mondada, 2014).

The requirement of confidentiality was dealt with in several ways. All names of persons, geographical spaces, and schools are anonymized. All illustrations wherein pictures from the fieldwork are used have participants masked in various ways. All video and audio recordings are stored on hard drives, cloud storage, and servers to which only I and my head supervisor have access. Therefore, the requirement of usage is fulfilled.

Ethical reviews were considered before the interviews with students and the field studies. However, as no sensitive data would be collected and no person would be identifiable, it was judged that no ethical review was necessary.

Finally, I decided not to video record the sports lessons due to the participating students' privacy.

The studies

This thesis is a compilation of four different studies. These studies contribute to the understanding of how the one-school-for-all discourse frames the digitalization of the Swedish educational system, and thus facilitate the mapping of the discourse cycles that intersect in the nexus of practice. In the following sub-sections, the four studies will be presented.

The four studies are presented in publishing order. Study 4 is still a work in progress. However, the presentation order should not be considered a chronology. The discourse cycles are entwined and are circulating in temporal and spatial spaces independent of which study is in focus.

Study 1 – Inscriptions and Digitalization Initiatives Across Time in the Nation-State of Sweden: The Relevance of Shifts and Continuities in Policy Accounts for Teachers' Work

Lars Almén and Sangeeta Bagga-Gupta (2019)

Published in Sangeeta Bagga-Gupta, Giulia Messina Dahlberg, and Ylva Lindberg (Eds.), *Virtual Sites as Learning Spaces: Critical Issues on Language Research in Changing Eduscapes*, 27–62. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-26929-6_2

The first study scrutinizes policy documents that formed the governmental initiative to digitalize the Swedish school system and contributes to the study by identifying crucial actors and discourse cycles on the macro level of the governmental digitalization strategy. The study unpacks how the one-school-for-all discourse was crucial in the shaping of the digitalization strategy. However, the study also sheds light on how economic discourses are interdiscursively entwined with the one-school-for-all discourse.

In this study several macro-level actors that are involved in policy making are identified. As a governmental decision is one of the most influential written acts in Sweden, the actors involved in the policy-making process could be considered crucial. The Swedish National Agency for Education is

responsible for Swedish curricula. As a member of the European Union, Sweden is obliged to follow legislation and regulations of the European Union. Governmental decisions, curricula, and EU regulations are all examples of what could be conceptualized as inscriptions. Based on the notion of inscriptions in actor-network theory (Latour, 1986) and sociocultural perspectives and policy discourse analysis described by Scollon (2008), Study 1 analyzes inscriptions behind the digitalization strategy that was enacted in 2017 and which will be fully implemented in 2022.

The study has a historical perspective going back to the EU's eight key competences of 2006. According to Latour (1986), it is the inscriptions that give power to the important actors. Following Roth and McGinn (1997) who raise the questions of who is being served by the inscriptions and what the political, ideological, moral, and ethical implications of the inscriptions are, crucial actors could be identified. Säljö (2005) highlights that to understand how people learn, we must understand the development of collective knowledge manifested in the mediating tool of inscriptions. In this study documents are considered *frozen action* (Norris, 2004) and as such are scrutinized as a social action in a nexus analysis (Scollon & Scollon, 2004). The discourses identified in the documents have temporal trajectories with historical bodies and future actions and anticipations, i.e., discourse cycles.

The selected document has been scrutinized in accordance with the analysis scheme for Public Consultative Discourse Analysis (PCDA) (Scollon, 2008), which is described in the "Policy documents" sub-section of the "Navigating the nexus of practice" section of this thesis.

In the analysis process three themes emerged: the chained nature of the policy documents, i.e., the historical bodies, a shift across time from a digital competence discourse to a programming discourse, and finally that different policy documents have different degrees of agency. From the fact that documents are supposed to have agency in Study 1, agency is slightly differently conceptualized as the relational characteristics of agency between social actors is lost.

The chained nature of the policy documents is expressed in their references that link one document to earlier documents. The references can lead temporally backwards or to a new parallel chain of documents. Thus, the chains of policy documents constitute a *web* of policy documents. The second theme found in this study, the shift from a digital competence discourse to a

programming discourse, highlights how the digitalization discourse shifted in focus from a general level of skill in the emerging technology to a discourse in which the specialized discourse of programming was desirable. The programming discourse was later implemented in the mathematics curricula across the whole school system. However, interdiscursively entwined with both the digital competence discourse and the programming discourse is an international competitiveness discourse. From the earliest scrutinized documents and onwards, digitalization was considered a mediational means for economic growth and competitive market advantages, especially in the labor market.

The last theme reveals how the power of one document to influence and affect other documents or social actors is reflected in the document languaging. Agency is related to the issuer of the document; a governmental document has for example a high degree of agency. However, the issuer issues a document with different degrees of agency. In the scrutinized documents a high degree of agency is expressed in bureaucratic language, extensive use of bulleted lists, and a realis, i.e., imperative, modality of language use, e.g., use of the verb “shall.” High-agency documents have few illustrations, normally only a logotype. Documents with a lower degree of agency are more publicly accessible, with less bureaucratic language. They have more illustrations, such as charts, use other type faces, and are often colorful.

In the analysis of the policy documents, both the documents and their issuer are considered actors as they influence other actors. As actors, they have historical bodies. The historical bodies of the policy documents are manifested in their references to other documents. However, documents are also part of social actors’ historical bodies. The curricula and syllabi are for instance internalized in the teachers’ historical bodies. One important one-school-for-all discourse found in the policy documents and highlighted in the study as an ethical or moral discourse is the discourse concerning the equality between men and women. Digitalization of the educational system is considered to increase the girls’ interest in technology and to increase the boys’ interest in school. However, the gender equity discourse is interdiscursively entwined with the (market) economic discourse as well. Hence, the international competitiveness discourse is entwined with the one-school-for-all discourse.

Another crucial one-school-for-all discourse circulating in the policy documents that shaped the digitalization strategy was the unequal distribution

of digital competence and unequal access to digital tools between different schools, and even between different students at the same school. The unequal distribution of digital competence and access has a direct influence on the first two areas of focus in the digitalization strategy.

Study 2 – Access to and Accounts of Using Digital Tools in Swedish Secondary Grades. An Exploratory Study

Lars Almén, Sangeeta Bagga-Gupta, and Cecilia Bjursell (2020)

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The second study contributes to the thesis by identifying discourses of digitalization in educational settings circulating among lower secondary school students. It also contributes to the thesis by exploring discourses temporarily situated before the enactment of the governmental strategy. From a one-school-for-all perspective, Study 2 highlights how digital tools are both affordances and constraints for students with special needs. The second study also highlights how discourses of a school's compensation for socioeconomic deficits circulates among secondary students. Where the first study scrutinizes macro-level policy processes, this study thus takes as its point of departure the micro-level everyday classroom life.

The backdrop for Study 2 was the PISA survey 2012 that showed that Swedish schools are digitalized to a high degree but that the usage is unevenly spread. Further, the PISA survey showed that the more the students were using digital tools, the lower the PISA tests results were. The students were mostly using digital tools for searching for information on the internet and for writing, while digital tools were rarely used in mathematics (OECD, 2015). This raised the question of how the students themselves regarded digital tools, primarily within their everyday classroom life, but also in informal settings. The aim of Study 2 within the frame of this thesis is thus to identify discourses circulating among Swedish lower secondary school students regarding experiences of using digital (literacy) tools, both hardware and software, within institutionalized education. Details of the methodology used in Study 2 are accounted for in the “Student interviews” sub-section of the “Engaging the

nexus of practice” section, and details of the analysis of the data material are accounted for in the “Student interviews” sub-section of the “Navigating the nexus of practice” section.

Two main actors were identified in the interviews – teachers and students. Three themes were identified, and in each theme one or more discourse/s in place were identified.

The first theme is *the traditional classroom*. The characteristics of the traditional classroom (Scollon & Scollon, 2004) are accounted for in the “Nexus analysis” section of this thesis. One crucial discourse in this theme is that the digital tools are used as a *substitute* for traditional tools. Another discourse identified under this theme is that classroom activities are to a great extent *text-centered*, i.e., the dominant classroom modality is written text. The third discourse identified in this theme is the *computer room*, where the students primarily meet the digital tools in their everyday classroom life. The interaction order of the traditional classroom is a part of both students and teachers. Therefore, new technology is supposed to fit what students and teachers are used to, i.e., what is a part of their historical bodies, rather than to change classroom work according to the new possibilities afforded by digital tools. As the digital tools are situated in a different space than the ordinary classroom, the computer room reinforces the traditional interaction order.

The second theme is *one-school-for-all* (in the study conceptualized as *equality*). Not everybody can afford to buy digital tools, therefore the students highlight that the school should provide them with digital tools. Students with special needs benefit from using digital tools in education. In other words, a *special needs* discourse is identified. Digital tools are supposed to compensate for various learning problems, e.g., dyslexia or mental disabilities. From a one-school-for-all perspective, the computer room could be considered to compensate for students who do not have access to digital tools outside school. In the computer room the students are using the digital tools on equal terms. However, students experience that the teachers expect them to use digital tools, e.g., to write a clean copy or find more background information, to get higher grades, and that the designated time in the computer room is not enough. Therefore, they must complete the work with digital tools at home. In other words, the socioeconomically vulnerable students whose families cannot afford to buy digital tools are hindered in achieving higher marks.

The third theme is the students' critical and reflexive analysis of the advantages and disadvantages of using digital tools in schools. The students want to use digital tools, as the tools make organizing their schoolwork easier, the results neater, and working more fun. The students highlight that digital tools give them more control over their own learning and the classroom activities vis-à-vis the teachers, something that is identified as an *agency* discourse. The students highlight that they often use their mobile phones for *music listening*, especially in mathematics. This is interesting as the subject of mathematics in other respects is considered the least digitalized subject, and that the students must hand in their mobile phones at the beginning of all lessons.

Study 3 – Gatekeepers and gatekeeping: On participation and marginalisation in everyday life

Sangeeta Bagga-Gupta, Giulia Messina Dahlberg, and Lars Almén (2021, in press). In Hanna Egard, Kristofer Hansson, and David Wästerfors (Eds.), *Accessibility Denied. Understanding Inaccessibility and Everyday Resistance to Inclusion for Persons with Disabilities*. Routledge.

The third study contributes to the thesis by identifying a discourse of digital tools affecting agency relations. In this, it confirms and reinforces findings in Study 2. Study 3 highlights how artifacts (e.g., digital tools) and policies can act as gatekeepers, both for inclusion and exclusion, in an educational setting after the implementation of the governmental initiative to digitalize the Swedish school system. This study, in line with Study 2, also highlights how digital tools redistribute agency between actors.

With an analytical point of departure in sociocultural perspectives, two examples are highlighted from Secundus School. The project DIP data is integrated with data from a parallel project in the CCD research environment, project Participation for All? (PAL; www.ju.se/ccd/pal). The data in Study 3, in contrast to the first two studies, was collected *after* the enactment of the governmental digitalization strategy. Secundus School is in the implementation process of the strategy, and all students have ubiquitous access to a school-provided laptop computer.

The first example from Secundus School is from a foreign language lesson. In this lesson only the girls were sitting in the classroom as the boys were in the

adjacent classroom doing their oral presentations. Therefore, the teacher's main attention was directed to the boys, though the teacher occasionally attended to the girls as well. The girls were working multimodally with textbooks, pencils, and paper, digitalized textbooks, and audio files. One of the girls was sitting by herself in the first row of the classroom. Despite the language lesson in progress, she was working with an essay in Swedish on her laptop computer. The first time the teacher visited the classroom, she remarked that the student was working on the wrong subject – Swedish instead of German. However, at the last visit, the teacher encouraged the student in question with the work with the Swedish assignment. This example highlights how the ubiquitous access to digital tools affects students' agency in both negative and positive ways. The laptop computer can mediate any subject anytime, which facilitates the student's working with the "wrong" subject, and therefore places them at risk of lagging behind the other students in the subject in focus. However, as this student was working on Swedish, she was facilitating the improvement of her skills in the mainstream school language. In other words, the laptop computer transferred agency to the student.

The second example is from a history lesson. The teacher was blind, something that was not immediately obvious, aside from when the teacher asked the students for the time. The teacher did not comment upon openly broken classroom rules, like handing in mobile phones at the beginning of the lesson or taking headphones off when the individual work phase ended, and the summarizing plenary phase began. The students in the history lesson had a higher degree of agency than in other lessons as they could have abused the circumstance of the teacher not being able to see them. However, with the digital tools, the teacher was able to reclaim some agency. The digital tools facilitated a blind person working as a teacher and acted as gatekeeper as well. This teacher listens to emails, booklists, lists of where students are seated, etc. Therefore, the digital tools increase the teacher's agency vis-à-vis the students. The digital tools are compensatory, and therefore fulfill the one-school-for-all ambition for both students *and* teachers.

Study 4 – Inclusion, exclusion and identity positioning in the digitalized classroom: going beyond the “digitalization” in a digitalization strategy

Lars Almén

Manuscript, work in progress²⁴

The fourth study contributes to the thesis by identifying discourses of digital tools as mediators of identity positioning. The study also highlights how digital tools, in their role as identity markers, act as tools for inclusion and exclusion, i.e., both facilitating and constraining the one-school-for-all ambitions.

With a point of departure in sociocultural perspectives, and with analytical tools borrowed from the tradition of conversation analysis, three examples from digitalized classrooms are presented. The common theme for the three examples is that they highlight the role of digital tools as a “mediating means”, or cultural tools, in the technology-infused classroom. The three examples in Study 4 are all from Secundus School, however both from grade 7 and 8. In grade 7 the students have ubiquitous access to a school-provided iPad, and in grade 8 a laptop computer. In other words, in line with Study 3 this study collects data from the implementation process after the enactment of the governmental digitalization strategy.

In the study three classroom examples are discussed. Each example corresponds to one of the three research questions of the study. The first example highlights how the digital tools mediate the students’ personal taste and identity expressions. Students have always expressed their personal taste and identity in the classroom, for instance through clothing or haircuts, but digital tools give students new means to express themselves. In four pictures, four expressions of taste and identity are illustrated. The first picture shows how a student personalized his iPad by changing the desktop background image. The next picture illustrates how one student showed another student his personal clothing taste by browsing a web shop during the lesson. The third picture illustrates how a girl is displaying her personal interest by browsing a

²⁴ This manuscript has been submitted to the New Zealand Discourse Conference, December 2021

skateboard web shop. The last picture illustrates how a boy showed his personal music taste by playing a YouTube video. The last three of these pictures also illustrates how identity positioning in the classroom can take considerable lesson time, which decreases the compensatory effect of the digital tools for the students who need it most.

The second example highlights how digital tools can be tools for mediating inclusion and exclusion in the technology-infused classroom. One important rationale for Swedish schools' investment in digital tools is the explicit objective for the school to compensate for students' deficits outside school in line with the one-school-for-all discourse. One such deficit is socioeconomic marginalization. Not all Swedish families can afford expensive digital tools. Therefore, the school compensates these families by providing digital tools. To avoid marking the marginalized students, *all* students are provided with digital tools. However, as this example illustrates, students still bring personal digital tools like headphones to school. To use headphones is sometimes allowed during the lessons, and the school provides the students with headphones. However, many students prefer to use their own headphones. These are often expensive. Only one student was using the school-provided headphones, while all the other students are using their personal headphones. This marked the student who used the school-provided headphones. The marking is doubled as the teacher labelled the school-provided headphones as "simple". This is an example of how the one-school-for-all ambition results in exclusion.

The third example illustrates how digital tools mediate a shift in the plenary classroom interaction order. The classroom situation in focus represents a shift in the interaction order from a lesson phase of individual student work to a plenary summing up phase. During the individual work phase the students can wear headphones and listen to music, an activity that the teacher concludes in the transition to the plenary phase. Traditionally, the plenary phase is characterized by a teacher-centered IRE interaction order. However, some students do not follow the teacher's instructions to put their headphones down. In this example, two excerpts from the lesson in focus illustrate how the interaction order is influenced when a student opposes the teacher's instruction. The students increase their classroom agency by influencing the interaction order, and the teacher loses agency to a corresponding degree. The personal digital tools are important identity markers for the students. In this school it is common practice, and a declared policy, that all students hand in

their mobile phones at the beginning of the lesson. This is a way for the school to maintain control over the classroom interaction order. However, the example in focus is concluded with a picture of students ignoring the declared policy to hand in the mobile phone. As this example highlights, the intention with the mobile phone ban is lost when the students have access to laptops and headphones.

Named languages and linguistic structures are important tools for identity expression. The concluding discussion section of the study highlights digital tools as mediating identity expressions, which becomes even more powerful for students who for various reasons have problems with the mainstream classroom language. By changing desktop backgrounds, displaying web shops, music playlists, and YouTube videos, the students are languaging. In the historical bodies of the students, both the school interaction order and the digital tools are internalized. However, for many students the school interaction order does not include digital tools. The digital tools are considered tools for leisure and entertainment, which risks leading to cyberslacking. This study shows that cyberslacking can take considerable valuable lesson time, with the consequence that students who have problems following the course pace and lag behind their peers are at risk of falling further behind. The out-of-school character of the digital tools is something that is further emphasized when the students bring their personal digital tools from home to school. Students who do not have the ability to bring personal tools to school risk being marked and excluded from the classroom community. If this is due to socioeconomic circumstances, these students are at risk of being double marked. If these students come from an ethnic background different than students from the dominant group, they risk being triple marked. Strong societal forces in Sweden, including the government, have advocated for a national mobile phone ban in the classroom. From a one-school-for-all perspective, this study suggests a ban on *all* personal digital tools in school.

Discourses in place

The four studies upon which this thesis rests cover six years, from 2014 to 2020. However, that temporal space is divided into temporal sub-spaces – from moments in a classroom situation to years-long policy processes, what Scollon and Scollon (2004) would call from circadian to solar time-spaces. Moreover, these studies cover a multitude of spaces: schools, classrooms, interview rooms, conference rooms, etc. From one perspective, this thesis covers 23 years, from 1997 when I began working as a practicing teacher, to 2021 when I am writing this. Or even 35 years, from the middle of the 1980s when I first encountered digital tools in an educational setting. An ethnographer always carries a baggage (Agar, 2008), and my personal experiences of the Swedish school system and digitalization processes have undeniably colored my gaze on the phenomena – an ethnography is not objective (Agar, 2008; Wolcott, 2008). The picture is further complicated by the frozen character, both temporal and spatial, of the policy documents, that plays an important role in the ethnography. Nexus analysis is especially suitable for analyzing such complex, multi-scalar phenomena (Hult, 2015).

To conduct a nexus analysis is to navigate the temporal and spatial trajectories: “the analyst works his or her way through the trajectories of participants, places, and the situations both back in time and forward through actions and anticipations to see if crucial discourse cycles or semiotic cycles could be identified” (Scollon & Scollon, 2004, p. 9). In the following section seven one-school-for-all-related discourse cycles that are identified in the DIP project will be accounted for and discussed. The salient discourse cycles include the computer room discourse, programming discourse, one-school-for-all discourse, hardware-focused discourse, identity discourse, entertainment discourse, and agency-redistribution discourse. The discourses in place are thereafter synthesized in the nexus of practice.

The computer room discourse

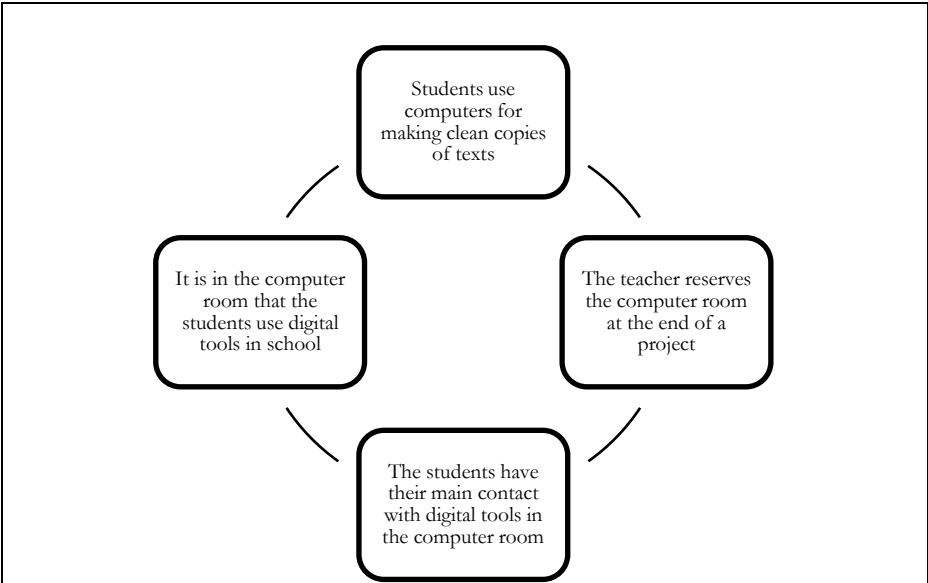


Figure 10. The discourse cycle of the computer room as the place where the students use digital tools in school.

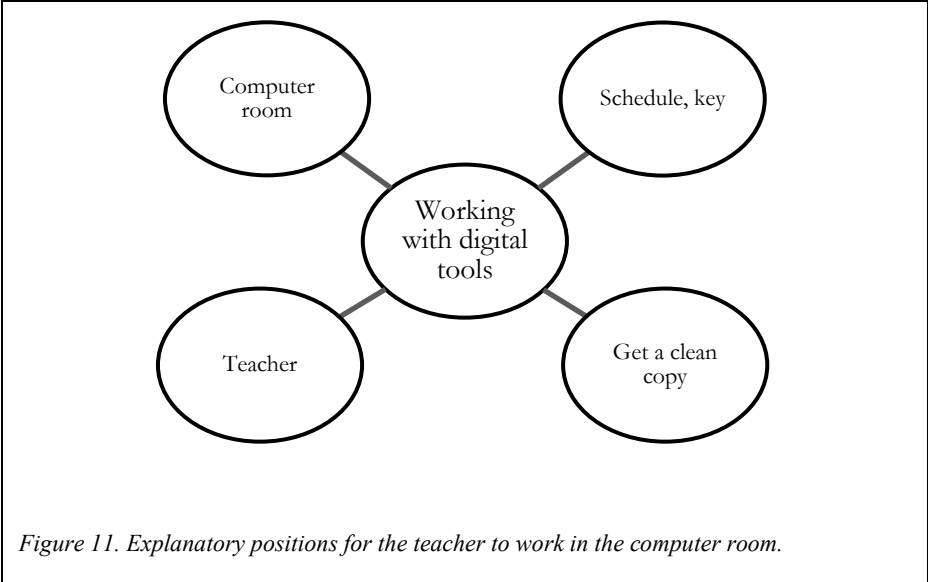


Figure 11. Explanatory positions for the teacher to work in the computer room.

From an interview with a student 27 May 2016:

We have two places with computers. [...] One a bit bigger and one a bit smaller. [...] Which you can rent... reserve when you have for example... a writing assignment, we have to make a fair copy. And rent them for a lesson and making a fair copy. Much like that. Smaller things. And when you make PowerPoints you rent it for a couple of weeks. For some time.²⁵

Excerpt 1. Student accounts for the computer rooms as the place to work with digital tools.

In the late 1990s, when I began working as an upper secondary teacher, the school computers were placed in special computer rooms. The student account in Excerpt 1 illustrates how the computer room is still common in Swedish schools in the late 2010s, i.e., before the digitalization strategy was enacted, and the implementation process had started. For most of the students in 2016 the computer room was the most common place in school for them to work with digital tools during their lessons, and the computer room had become a part of the historical bodies of both students and teachers. It came to be expected that the computer room would be the space for working with digital tools (Figure 10). From a one-school-for-all discourse perspective, the computer room can be considered a democratization of access to digital tools in school. All students have equal access to the digital tools; they are using the same digital tools at the same time, and with the same instructions.

All schools offered courses in computer studies. This subject had different curricula in different schools. In an e-mail conversation on 9 August 2016, one headmaster reports that in her school the students learned Word, PowerPoint, saving files, e-mail, using the learning management system, using iPad applications, and movie making. One student recounted how they had learned web design in their computer studies class. However, one student recounted that they mostly take the opportunity to work digitally with other subjects when they have computer knowledge. For some ambitious students, this extra computer room time is considered crucial to getting high grades. One student recounted in an interview on 3 June 2016 that “We got three

²⁵ In original: Vi har ju två ställen där det finns datorer. [...] Ett lite större och ett lite mindre. [...] Som man får hyra... boka när man har till exempel... vi har en skrivuppgift, vi måste renskriva. Och hyr dom en lektion så renskriver vi. Mycket sånt. Småuppgifter och så när man ska göra Powerpoints så hyr man den i kanske några veckor. En tid så där.

lessons in school when we had access to computers. However, in this time can't you write so much, so if you don't have a computer at home... Well, you can't reach such a high [grade]"²⁶. This quote illustrates how different discourse cycles are discursively entwined. The computer room discourse cycle sees the teacher reserve the computer room for three lessons and the student anticipate that this is the space where computers are used in school. However, the computer room is discursively entwined with the one-school-for-all discourse cycle, where the student highlights how socioeconomically weak students, or other students who for some reason do not have access to digital tools at home, do not have the same chances to get high grades as other students. The one-school-for-all discourse cycle will be accounted for later, in the "Compensatory tools – one-school-for-all discourse" sub-section. There are other discursively entwined discourses evident in the student's quote, e.g., the grade discourse, that are not a part of this nexus analysis.

Despite the computer rooms, I experienced that student situations varied greatly, both in the work with this thesis and as a practicing teacher, regarding access to digital tools in school before the enactment of the governmental strategy to digitalize the Swedish school system. In the five schools I visited before the enactment of the digitalization strategy in two different municipalities, one school, Secundus School, provided all secondary students with iPads, and in another school one grade 8 class was an iPad "experiment class," where all students in that class had ubiquitous access to an iPad. The other students in that school had to use the computer room. However, in some schools the library provided a few computers to the students. In another school the students could ask a teacher to open the computer room if it was not scheduled. Some classrooms had one or two classroom computer/s. And, finally, all five schools where interviews were conducted before the enactment of the digitalization strategy had access to one or a few trolleys with iPads that the teacher could reserve. Lack of access forced the teachers to create lesson plans that mixed analog work in the classroom with occasional access to digital tools. Primarily this meant a need to reserve the computer room.

The discourse cycle of the computer room as the place where the students use digital tools is illustrated in Figure 10. The computer room as the place where

²⁶ In original: Vi fick tre lektioner i skolan då vi hade tillgång till datorer men på den tiden hinner man inte skriva så mycket så att ifall man inte har en dator hemma så då... Ja, då kan man inte nå så högt [betyg].

you use digital tools was a part of the students' historical bodies, it became anticipatory, even before the enactment of the digitalization strategy and the implementation process started. The purpose of the teacher reserving the computer room is to get a clean copy of handwritten work, which is illustrated in Figure 11. The students highlight that the teacher could have problems getting access to the computer room, as colleagues reserve the computer room "just in case." Because of the problems with the computer room the interviewed students who attended the one-to-one iPad class argued that one advantage of the iPads is that they do not have to use the computer room, or, as one student expressed it in an interview 8 April 2016: "And then we don't have to reserve the computer room, which is good as we can use the classroom"²⁷.

According to the students' accounts, the computer room is mostly used in subjects like Swedish and social sciences. The unbalanced usage of digital tools between different subjects has been known for a long time. Digital tools are used to an especially small extent in mathematics. This circumstance, entwined discursively with the one-school-for-all discourse, is one rationale for the programming discourse.

²⁷ In original: Och då slipper vi också boka datasalen, vilket ju är bra för då kan vi ju använda klass-salen.

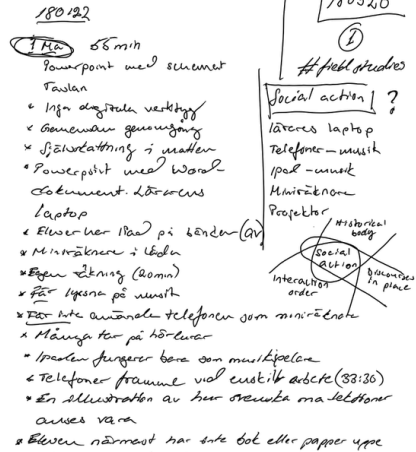
The programming discourse

180122

Mathematics, 55 minutes

PowerPoint with the timetable on the whiteboard

- The students are not using any digital tools.
- A whole-class presentation.
- A self-assessment in math.
- The teacher is showing a PowerPoint with Word document from the teacher's laptop.
- The students have their iPads on their desks (switched off).
- The calculators are stored in a box on the teacher's desk.
- The students are working individually with calculation for 20 min.
- During this lesson phase they can listen to music.
- However, they are not allowed to use a mobile phone as a calculator.
- Many students wear headphones.
- The iPad is only used as a music player.
- This is an illustration of how lessons in Sweden are supposed to be, how lessons are part of students' and teachers' historical bodies.
- The student closest [to me] has neither book nor paper at hand. During the following plenary phase, the student at the back seat has problems with letting the phone be.



Fieldnote 1. From the fieldnotes 18 March 2018, a mathematics lesson.

En lektion helt utan digitala verktyg - eleverna
 ser detta som normaltillstånd
 Räkning i boken 11:57. Med det samma fråga:
 "Får man ha musik?" (Svar: "Nej, det så lite tid
 kvar")

A lesson completely without digital tools – the students consider this a normal condition. After 11:57 the individual lesson phase starts with calculation in the book. Immediately a student asks: "Can we listen to music?", and the teacher answers: "No, there is so little time left."

Fieldnote 2. From the fieldnotes of 14 May 2018, a mathematics lesson.

The differences between different actors regarding digital solutions were an important rationale for the digitalization strategy of 2017, and the backdrop to the first two focus areas of the strategy: digital competence for all in the school system, and equal access to and usage of digital tools for all in the school system. However, there were not only differences in competence, access, and usage between different schools and classes, there were also differences between different subjects. A typical answer from the students on the question of whether there are subjects where digital tools are used less than in others is the following utterance from a student interview, 13 May 2016: "Well, not so much in math [...] Because there I have a book and then I can write numbers."²⁸ If the students have digital tools, they bring them to the classroom. However, in many lessons, foremost mathematics, as shown in Fieldnote 1 and Fieldnote 2, and science studies²⁹, digital tools are not used, a phenomenon confirmed in other studies (Olofsson et al., 2018). The interviews were conducted before the enactment of the digitalization strategy; however, except for a few Word documents and PowerPoint presentations by the teacher, in the DIP project data no digital tools were used in the mathematics lessons after the enactment either.

The low extent of usage of digital tools in mathematics was well-known by the policy makers of the digitalization strategy. Maybe the lack of usage of

²⁸ In original: Ja, inte så mycket matten [...] För där har jag en bok och sen kan jag skriva siffror.

²⁹ Digital tools are occasionally accounted for for use in writing essays in natural science studies. However, as a pedagogic tool for natural science *per se*, digital tools are scarcely used.

digital tools in mathematics in combination with the first focus area of the digitalization strategy (the one-school-for-all-framed focus on “digital competence for all,” i.e., striving to use digital tools in a creative way for all actors in the school system) is a reason why programming became focused on the digitalization strategy.

The programming discourse could be traced to The Digitalization Commission (2014). Two main arguments are raised in this policy document for introducing programming into the Swedish curriculum. First, the creative aspect of being able to produce digital material. In other words, this argument is congruent with the first focus area in the digitalization strategy: digital competence for all in the school system. Therefore, as is argued earlier, this argument can be considered a one-school-for-all-framed argument, as the basic rationale is to offer *all* students the opportunity to learn this creative tool. The second argument for introducing programming for all is the argument of international competitiveness: “if Sweden is to remain a strong knowledge nation and keep its competitive power everyone [sic!] will have to learn a new language: programming code”³⁰ (The Digitalization Commission, 2014, p. 50). The Digitalization Commission highlights how other countries have introduced programming in their curricula, and that Sweden should do the same in order to not fall behind.

³⁰ In original: ”för att Sverige fortsatt ska vara en stark kunskapsnation och behålla sin konkurrenskraft så behöver alla lära sig ett nytt språk: programkod.”

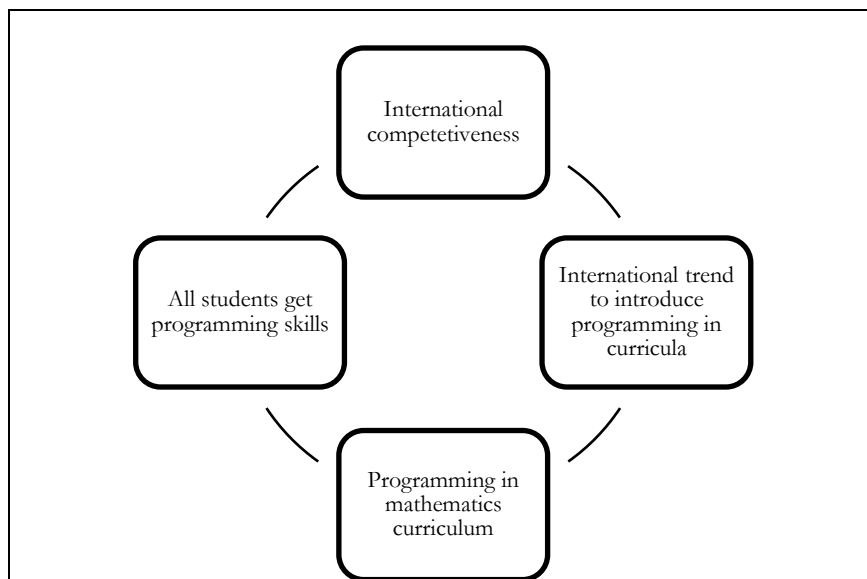


Figure 12. The discourse cycle of international competitiveness as an argument for introducing programming as a part of the mathematics curriculum.

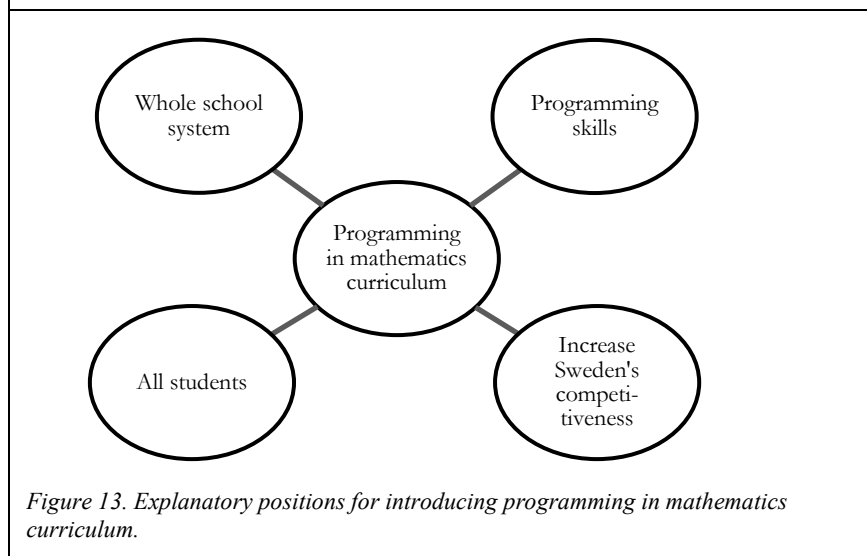


Figure 13. Explanatory positions for introducing programming in mathematics curriculum.

In the syllabi for both compulsory school (The Swedish National Agency for Education, 2018) and upper secondary school³¹ (The Swedish National

³¹ Not all upper secondary students study programming in mathematics. It is foremost students participating in the Natural Science Programme and the Technology Programme who study programming in the subject of mathematics.

Agency for Education, 2017), programming became mandatory in mathematics education. The programming discourse was not a part of the early policy documents; it is for instance not mentioned in the digitalization strategy of the European Union (European Commission, 2010), upon which the Swedish digitalization strategy rests. As was highlighted earlier, mathematics is the subject where digital tools are least used, and from 2017 one of the most advanced digital competences, programming, was introduced in mathematics on all school levels. It could be considered strange that such a specialized thing as programming became highlighted, rather than any other creative digitalization processes like image manipulation or image creation. To some extent, the answer can be found in the second argument from the Swedish government for introducing programming: competitiveness. “[M]ost schools’ technology policies are imbued with a belief that digital technology can act as a means of increasing a nation’s economic competitiveness” (Selwyn, 2011, p. 61). Figure 12 highlights the discourse cycle of the programming discourse. With programming as a part of the students’ historical bodies, it is anticipated that students will develop the programming skills, which will benefit Sweden in international competitiveness. In the transition of the Swedish society from mostly farming, via industry, to a so-called information society, programming is considered an important skill, an explanatory position that is illustrated in Figure 13. Today, there are economic investors who go so far as to appoint game development as the new Swedish basic industry³².

As we have seen in this sub-section, international competitiveness is a driving force for introducing programming as a part of the mathematics syllabi. This macroeconomic discourse of international competitiveness is, however, discursively entwined with the one-school-for-all-discourse-framed argument of introducing the creative tool of programming to all students. The one-school-for-all discourse is also more explicitly expressed, as we will see in the next sub-section.

³² <https://www.svt.se/nyheter/ekonomi/datspelsbranschen-var-nya-basindustri>

Compensatory tools – one-school-for-all discourse

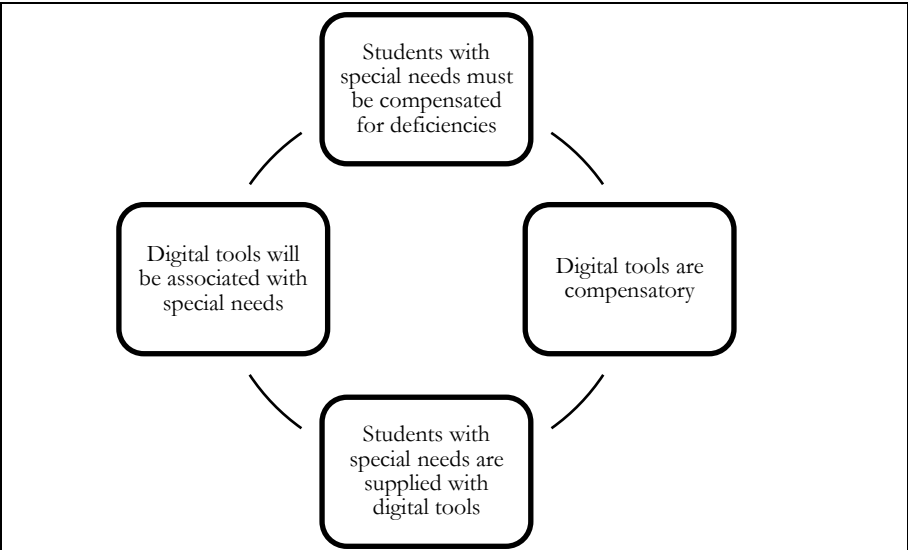


Figure 14. The discourse cycle of digital tools as tools for compensation for students with special needs.

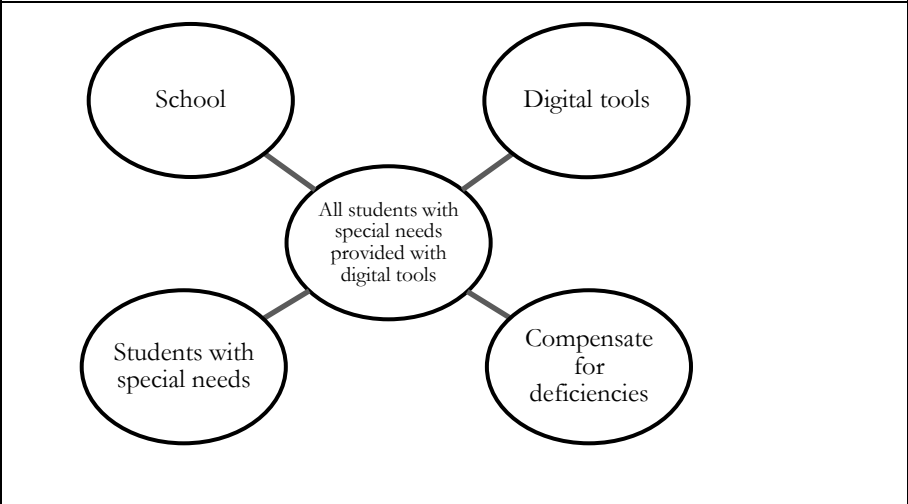


Figure 15. Explanatory actions for providing students with special needs with digital tools.

The one-school-for-all discourse is, as we have seen above, a comprehensive discourse that frames the school system in Sweden. Crucial to the one-school-for-all discourse is the mandate of the school to compensate for deficiencies outside school. In this thesis three deficiencies have been distinguished that

are supposed to be compensated for by digitalization: digital tools as compensatory tools for *students with special needs*, digital tools as compensatory tools mediating coming to terms with *lack of gender equality*, and digital tools as compensatory tools for coming to terms with *socioeconomic differences*.

From an interview with a student 15 April 2016:

[Digital tools] are something I use all the time, because I have dyslexia, so I use an iPad for everything in school.³³

From an interview with a student 21 May 2016:

[Student] Yes, I have the best program I have found, it is... Do you know what Reading Service is? [Me] Yes, right. [Student] I think it is really great! [Me] Yes, in what way? [Student] I don't have to write. I don't have to ask my parents to read it to me. I can sit in my room and listen...³⁴

Excerpt 2. Students with special needs highlighting the compensatory function of digital tools.

Students with special needs had access to digital tools before the enactment of the digitalization strategy as a means for compensating for deficiencies in relation to mainstream students. In many schools, students with special needs were the first, and for a long time only, students with ubiquitous access to digital tools. The rationale was that digital tools could compensate for dyslexia or other disabilities that could affect learning in a negative way (Figure 15). The discourse that digital tools could compensate for difficulties that students with special needs can meet in school is so established that before the enactment of the digitalization strategy, digital tools were primarily associated with special needs (Figure 14, Figure 15). Students with special needs do appreciate digital tools, as the students in Excerpt 2 account for. The five interviewed students with special needs all had ubiquitous access to either an iPad or a laptop computer. Four of these five students attended classes where the mainstream students did not have ubiquitous access to digital tools. The students with special needs said that access to digital tools was a major improvement for their ability to keep up with their peers. Especially highlighted was the possibility of having textbooks read aloud. In the

³³ In original: [Digitala verktyg] är någonting jag använder hela tiden, eftersom att jag har dyslexi, så jag använder iPad till allt inom skolan.

³⁴ In original: [Elev] Ja, jag har det bästa programmet som jag typ fått fram, det är... Du vet vad inläsningstjänst är? [Jag] Ja, just det. [Elev] Det tycker jag är jättebra. [Jag] Ja, på vilket sätt? [Elev] Att jag slipper läsa. Jag slipper be mina föräldrar kan läsa det för mig. Kan jag sitta på mitt rum och lyssna på...

ethnographic data two variants of read-aloud textbooks can be found. The first variant is *Inläsningstjänst* (Eng. Reading Service), a commercial service that is available for schools in Sweden and that audio transcribes textbooks. The other variant is the synthesized reading of texts in word processor or document presentation applications, so called text-to-speech. Reading Service is considered to play a real compensating role, something that a student in Excerpt 2 accounts for. Furthermore, one teacher in Secundus School uses text-to-speech technology, which is shown in Study 3 in this thesis. For some of the students, this facilitates their learning. However, digital tools can also become a problem for students with special needs, as the following excerpt illustrates.

From an interview with a student 15 April 2016:

Now it isn't like that because everyone has it [an iPad], but it was like people saw that this girl has problems in school. [---] For some it is good [to have access to an iPad], but it is also a little worse for me. Because I have used the iPad as it goes faster for me [to study], now it is faster for them as well, so they must wait for me anyway.³⁵

From an interview with a student 13 May 2016:

Those with reading disabilities get access to iPads. And we are getting it sometimes.³⁶

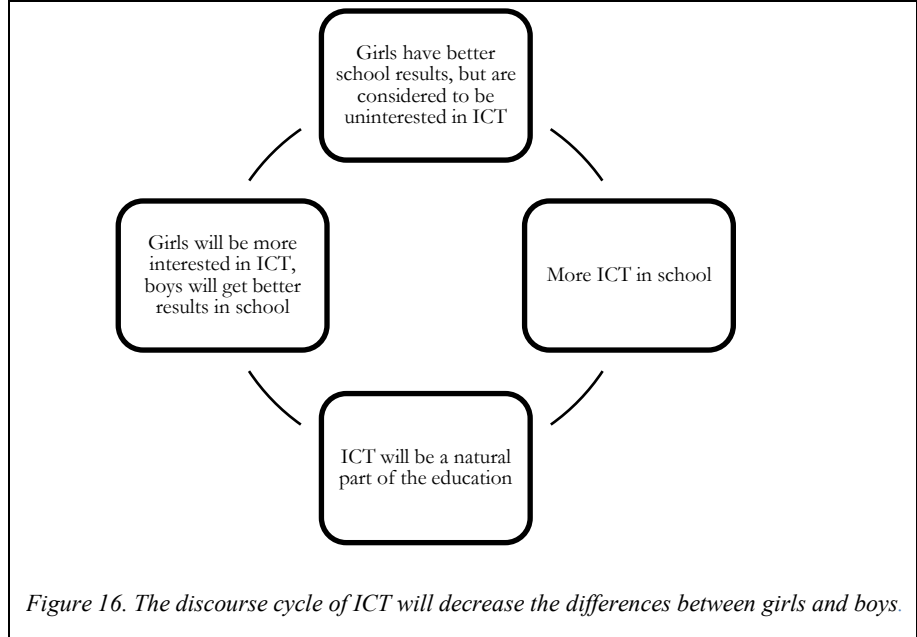
Excerpt 3. Students account for how digital tools could mark students with special needs.

The second objective of the digitalization strategy was “Equal access to and usage of digital tools for all in the school system.” As is highlighted in Excerpt 3, “equal access” means that not only students with special needs have ubiquitous access to digital tools. Before the enactment of the digitalization strategy, it was common that only students with special needs had ubiquitous access to digital tools. Therefore, digital tools could be stigmatizing, something that the students in Excerpt 3 express. The first student in Excerpt 3 was part of the “iPad experiment” class in Alpha School (Figure 8), and at the same time was a student with special needs. This student was very grateful for the digital tools and their compensating role. However, she points out that when all students have ubiquitous access to a digital tool, the tools cease to

³⁵ In original: Nu är det inte så för att hela klassen har det, men det var ju lite det här att folk såg att den där tjejen har problem i skolan. [---] För en del är det ju bra [att ha tillgång till iPad], men det är också lite sämre för mig. För jag har ju använt iPaden för det går snabbare för mig [att studera], nu går det ju snabbare för dom också, så då får dom ju ändå vänta på mig.

³⁶ In original: Dom med läsproblem har tillgång till iPads. Vi har det någon gång.

compensate for the students with special needs, who once again have problems keeping up with the other students. In other words, for students with special needs digital tools could have paradoxical consequences. If they are the only students with ubiquitous access to digital tools, the tools can compensate for deficiencies and the special needs students can keep up with their peers in the classroom. On the other side, the digital tools are stigmatizing. If all students have ubiquitous access to digital tools, the digital tools are not stigmatizing for the students with special needs. On the other side, the advantages with digital tools for students with special needs vis-à-vis their peers decrease.



Another crucial discourse framed by the one-school-for-all discourse is the gender equality discourse. The one-school-for-all perspective on the lack of gender equality is characterized by concerns for structural inequalities, for example that women have lower incomes than men. From an educational point of view, income inequalities could decrease if the school encourages women to take interest in high-income sectors like technology and engineering. In Sweden, girls generally are more successful in school than boys and more women than men take part in higher education. However, on a societal level, men still dominate the technology sector, and engineering is the only sector in higher education with more men than women. In the preparatory work for the

digitalization strategy, these differences were highlighted, and ICT³⁷ was considered a mediational means to level them out (Figure 16), as the following quote from The Digitalization Commission (2014, p. 129) illustrates:

We judge that increased elements of IT in education will facilitate girls' interest in IT and in the long run contribute to decreasing the gender gap in recruitment to higher education with an IT focus [---] Several studies point to the fact that boys' reading and writing skills (and following from that, their potential in further education) benefit from digital tools.³⁸

In other words, digitalization of education is considered a general means for coming to terms with two gender-based problems in Swedish society: the imbalance between men and women in the technology sector, and the boys' poorer school results. Women dominate higher education in Sweden. In the academic year 2019/20, 62 percent of the students in higher education were women and 38 percent men (Statistics Sweden, 2019). However, in the technology sector the figures were opposite. Men dominate the well-paid private technology sector, while women dominate the less well-paid public sector. Therefore, if women's interest in technology increases, the income imbalance between men and women could decrease in the long run.

From an interview with a student 3 June 2016:

Everyone may not have [a computer] at home, and then they will not have the same prerequisites.³⁹

Excerpt 4. Student highlights how school-provided digital tools compensate socioeconomically weaker students.

As we have seen in “The computer room discourse” sub-section, students are aware of socioeconomic inequalities, and it is the mandate of the school to compensate for these inequalities. The student account in Excerpt 4 also illustrates how the one-school-for-all discourse is a part of the historical

³⁷ Information and Communication Technology

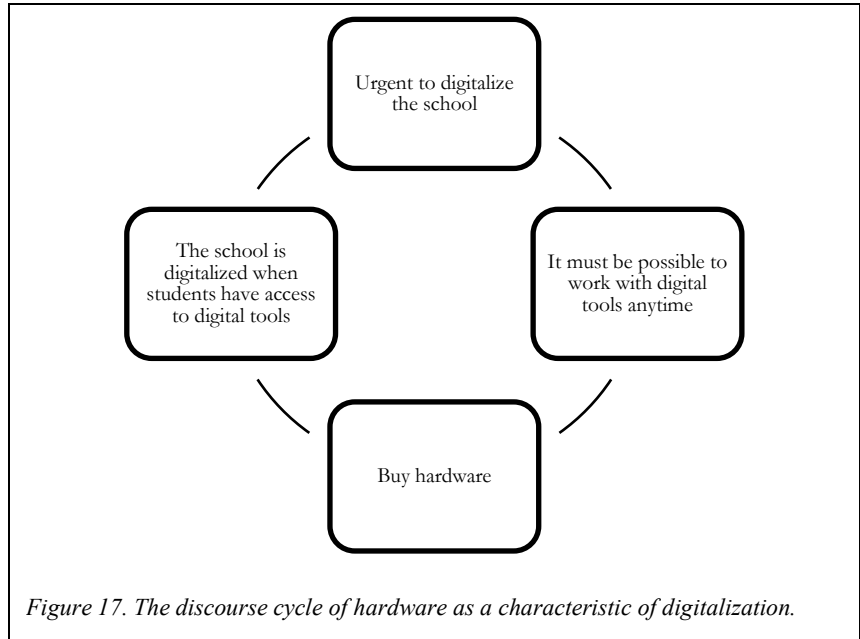
³⁸ In original: Ökade inslag av it i undervisningen bedömer vi till exempel kan främja flickors intresse för it och på sikt bidra till att minska den könsmissiga snedrekryteringen till högre utbildningar med itinriktning [---] Flera studier tyder på att pojkars läs- och skriftfärdigheter, och därmed deras möjligheter också under den fortsatta skolgången, främjas av digitala hjälpmedel.

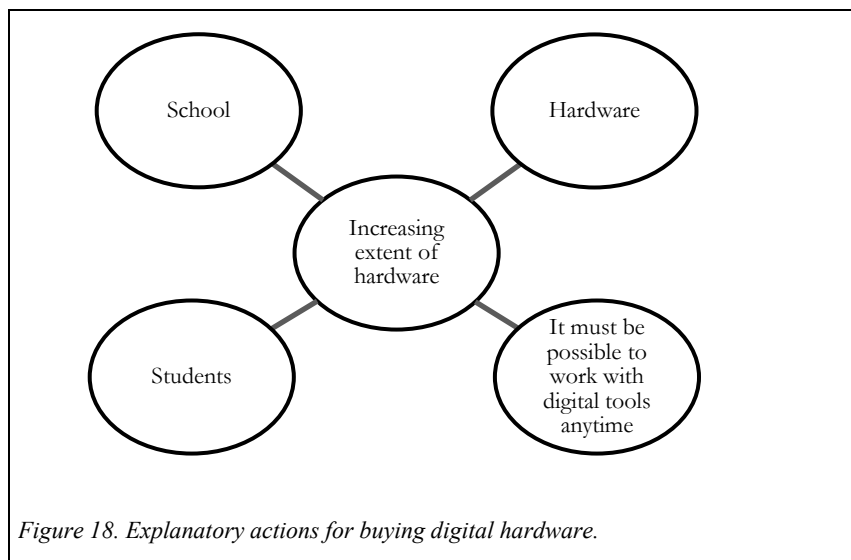
³⁹ In original: Alla kanske inte har en [dator] hemma, och då har dom inte samma förutsättningar sen.

bodies of all actors in the educational system, including the students. Students have different prerequisites, and the school is expected to compensate for socioeconomic differences between the students. The student in Excerpt 4, who was interviewed before the enactment of the digitalization strategy, highlights the compensatory mission of the school. As we have seen, this is an important rationale for the digitalization strategy. The focus area of the digitalization strategy that determines that digital tools will be accessible for *all* includes socioeconomically exposed students.

As this sub-section has shown, the one-school-for-all discourse highlights the compensatory role of the school. Traditionally this meant that students with various deficiencies were provided with digital tools, i.e., hardware like laptop computers or iPads. The second focus area of the digitalization strategy also highlights access to hardware, framed by the one-school-for-all discursive expression of “*equal* access and usage.” Therefore, is it not strange that hardware became a discourse in the digitalization process. The hardware discourse will be presented in the next sub-section.

The hardware-focused discourse





In the programming discourse sub-section, with the international competitiveness rationale of the programming discourse, it was highlighted how the digital tools discourse was not primarily considered a pedagogic discourse, i.e., a discourse on how to improve learning. In the wake of the enactment of the digitalization strategy, many schools had to consider how to implement the strategy. The primary objective became to fulfill the second focus area in the strategy: equal access to digital tools for all. Therefore, digitalization became a hardware-focused discourse, focused on supplying the students with hardware, e.g., buying laptops or tablets (Grönlund, 2017). Figure 18 highlights how digitalization became a hardware discourse. The school is considered digitalized when the students have access to digital tools, and the computer-per-student ratio becomes an important key figure. Key figures are important in the concept of new public management, which is the management principle for the educational system of Sweden. If the programming discourse was initiated as international competitiveness, key figures, like computer-per-student ratio, become important to *national* competitiveness, i.e., in the competition between different schools (Allodi, 2013).

Before the enactment of the digitalization strategy, the computer room was an integrated part of actors' historical bodies. The computer room was considered the physical space where digital tools were used in school. To have the possibility of working with digital tools in the classroom was therefore considered preferable and was one important rationale for investing in

hardware so the students could work ubiquitously with digital tools (Figure 18). The schools invested in digital tools for all, and *then* considered how to use the digital tools⁴⁰. In other words, the one-school-for-all discourse framed the *access to* digital tools expressed in the second focus area of the digitalization strategy. However, the first focus area, digital competence for all, i.e., the pedagogic dimension, was not highlighted to the same extent.

1 samtal med SO-läraren framgick att hon inte ser nyttan direkt. Vad skall man ha datorn till?
Snabb information, men inte så mycket mer

Läraren i SO tycker ofta att PC:n är ett störningsmoment

In a conversation with the teacher in social sciences it is evident that she does not see the direct benefit. What are you supposed to have the computer for? Fast [accessed] information, but not so much more. [She] often finds that the PC is a source of disturbance.

efter två hela dagar har datorn i princip inte använts som ett pedagogiskt verktyg. I alla fall inte så att det inte kunnat ersättas av något analogt.

After two whole days the computer has basically not been used as a pedagogic tool. In any case not so it not could be substituted with an analog.

Fieldnote 3. From the fieldnotes of 9 November 2018.

As is highlighted in Fieldnote 3, the teachers do not consider themselves to be involved in the digitalization process. The digitalization process is considered

⁴⁰ In 2006 I was attending meetings with the school management where we discussed how to motivate that the school purchased laptop computers to the students. However, these meetings were held *after* the computers were purchased.

a top-down policy process, something that is decided over the teachers' heads. Many teachers want to have more control over the digitalization processes. About half of the Swedish teachers interviewed in 2015 said that they wanted further education as to how to integrate digital tools in their pedagogy (Skolverket, 2016). Many teachers think that the lack of further education impedes their digital competence (Lindberg et al., 2017; Salavati, 2016). Teachers generally feel positively about integrating digital tools in their teaching; however, if they lack confidence in using digital tools this is a barrier to integrating them in their teaching (Bingimlas, 2009). As long as the teachers do not see the pedagogical benefits of the new digital tools being “dropped” into their classroom, it will be hard to fulfill the first focus area of the digitalization strategy: digital-competence-for-all, i.e., promoting the students' learning. It is often considered more important *that* the students can work with digital tools anytime, than *how* they work with digital tools. The focus is the *form* of teaching, not the *content* (Heath, 2016) and pedagogic issues, as is highlighted in Fieldnote 3.

The hardware-focused discourse highlights that the digital tools did not necessarily change the pedagogic work in the classroom. Nevertheless, digital tools are a part of everyday classroom life. When the students have access to digital tools, they use them irrespective of their pedagogic value. The next sub-section highlights how digital tools mediate students' identity positions in the classroom.

The identity discourse

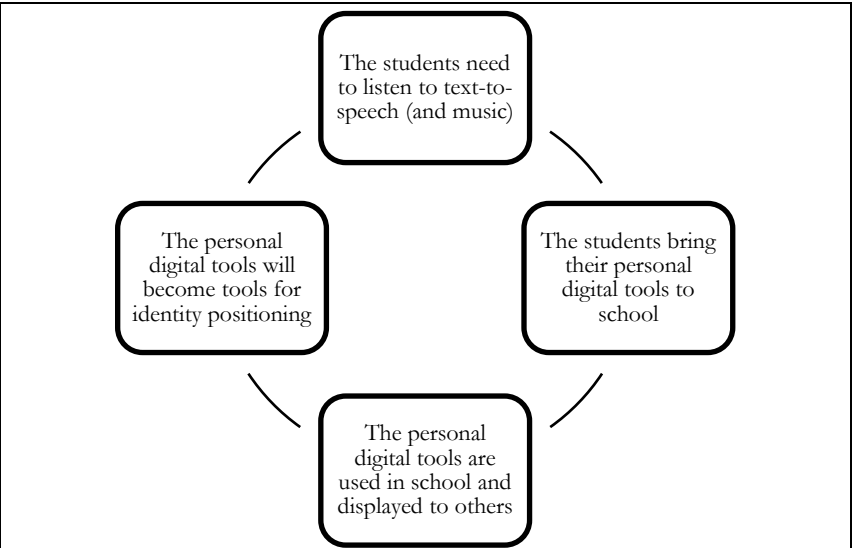


Figure 19. The discourse cycle of digital tools for identity positioning.

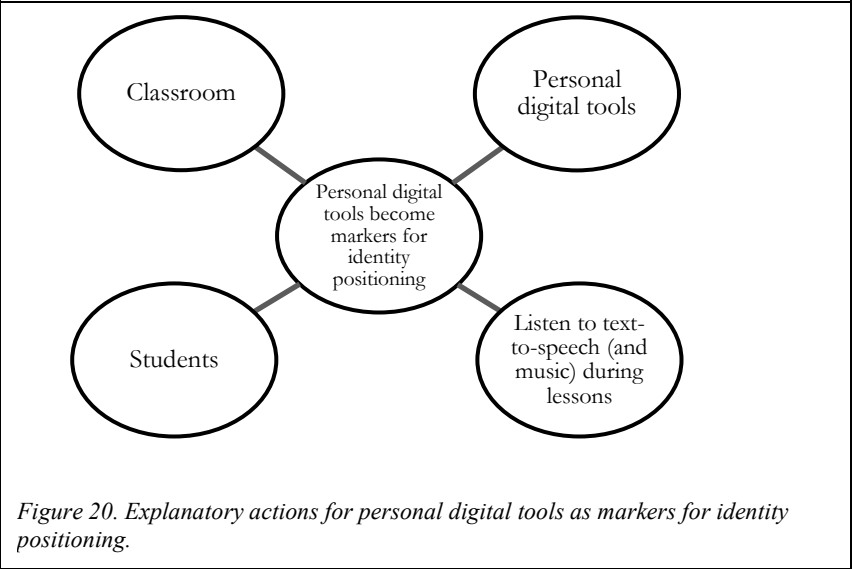


Figure 20. Explanatory actions for personal digital tools as markers for identity positioning.



Figure 21. School-provided headphones.



Figure 22. Student watching a YouTube video.

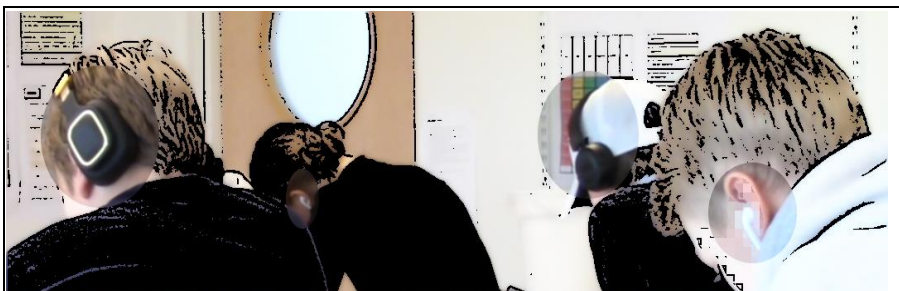


Figure 23. Students listen to music during a lesson.

Skolan har tydligt tillhandahållit hörlurar, men eleverna vill inte använda dem → eleverna ansöker sina egna → ett sätt att markera självständighet, men också status kan det vara så att man inte vill använda skolans hörlurar pga klassmarkör?

The school has obviously provided the students with headphones, but the students don't want to use them, therefore the students are using their own, therefore it is a way to express independence, but also status. Could it be that they don't want to use the school's headphones as they can class mark the students?

Fieldnote 4. From the fieldnotes of 22 March 2019.

As we have seen, the enactment of the digitalization strategy led to a situation in which the school now provides the students with digital tools. In Secundus School, the students transferred from iPads to laptop computers. Secundus School also provides the students with headphones in line with the one-school-for-all discourse, with the rationale of facilitating text-to-speech (Figure 20). However, as is highlighted in Fieldnote 4, the students use personal digital tools as well (Heath, 2016). The student in Figure 22 is not just watching the YouTube video, he is also listening to the music, just like the students in Figure 23. Students bring headphones and mobile phones from home to school. When the digital tools become personalized, they also become tools for identity positioning (Garcia et al., 2018; Rusk, 2019) and languaging, as the digital tools are mediational means of communication. The discourse cycle of the personal digital tools is illustrated in Figure 19. It is a part of the

students' personal bodies to bring their personal digital tools, foremost headphones, as Figure 23 illustrates, and mobile phones to school. Therefore, the anticipatory action will be that the personal digital tools will be means for the students to express their identity. The headphones are often expensive, and hence they also are tools for mediating socioeconomic identities, as it is obvious which students who are *not* wearing expensive headphones. These students are therefore at risk of being marked as socioeconomically low status in the classroom community. This is illustrated with the student in Figure 21 who is the only student in the focused class who is wearing the low-status-marked school-provided headphones. Headphones and mobile phones become visible semiotic signs of who has and who has not, of inclusion and exclusion, of mainstream and marginalization. The personal digital tools are gatekeepers of inclusion in the community of classroom practice (Lave & Wenger, 1991). Unattainable identity markers prevent already marked students' *legitimate peripheral* participation.

We have seen in the “Compensatory tools – one-school-for-all discourse” subsection how students with special needs lose their compensatory advantage when school-provided digital tools become ubiquitous. In a similar way, the socioeconomic levelling effect of school-provided digital tools are at risk of turning into socioeconomic marking when personal digital tools are allowed in the classroom. In both cases the one-school-for-all intention has turned to its opposite.



Figure 24. Student browsing a web shop.

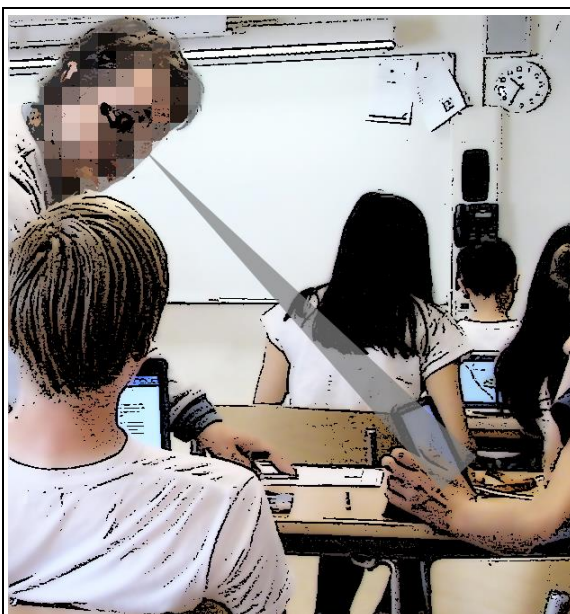
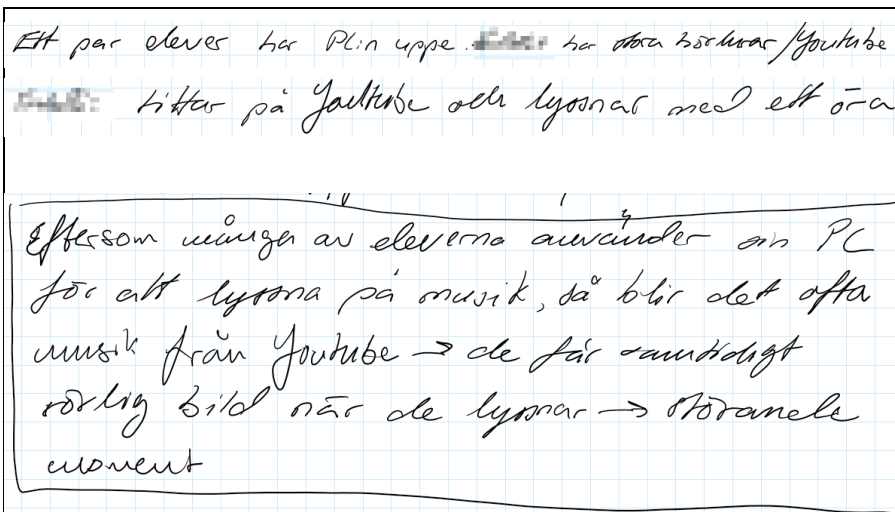


Figure 25. A student turns the iPad away from the teacher's gaze.

Personal digital tools communicate identity. However, the students use the school-provided digital tools for communicating identity as well. In the

traditional classroom, the teacher controls the interaction order and has control over the students' activities (hence the concept of a *panopticon* interaction order). However, in a classroom outlined as a traditional classroom, with students sitting in rows turned toward the teacher, and the students using digital tools, the screens are under the students' control, as the teacher only sees the back of the screens. The students, however, can see the screens of their peers sitting close to them, which is evident in Figure 24. A panopticon interaction order classroom with digital tools could be considered a *reversed* panopticon classroom. The screens become show windows of personal taste and identity, and many students are open with their YouTube videos, Spotify playlists, and favorite web shops (Figure 22, Figure 24). The screenshot in Figure 25 is taken from the same video-recorded lesson as Figure 24 and shows the same two students, 20 seconds earlier than the screenshot in Figure 24. In Figure 24 the student to the right has the iPad turned towards himself and his peer and is browsing a web shop. It is not until the teacher approaches that the student turns the iPad to the position in Figure 25.



Ett par elever har PC:n uppe. [The student] har stora hörlurar/YouTube
 [The student] tittar på Youtube och lyssnar med ett öra

Eftersom många av eleverna använder sin PC
 för att lyssna på musik, så blir det ofta
 musik från Youtube → de får samtidigt
 rörlig bild när de lyssnar → störande
 moment

Some students have opened their PC. [The student] is wearing big headphones and is
 watching YouTube videos. [The student] is watching YouTube and listens to the teacher with
 one ear.

As many students are using their PC for listening to music, much of the music comes from
 YouTube, therefore they get motion pictures when they are listening, and it becomes a
 disturbing moment.

Fieldnote 5. From the fieldnotes of 9 November 2018.

Another example of how the students' screens become tools for mediating identity is how they can express their personal music taste. When the students listen to music in mathematics, they are not allowed to watch their screens. However, in subjects where the students are supposed to write, for example in Swedish or social sciences, they use the iPad or PC. Hence, the students are watching, and showing, YouTube videos, as is highlighted in Fieldnote 5 and Figure 22. The student in Figure 22 shifts between the digitalized textbook, a streamed music playlist, and a YouTube video for 25 minutes before he finally starts the text-to-speech feature. The rationale for using digital tools is to provide text-to-speech; however, the anticipatory action is that video watching takes considerable lesson time. In other words, at Secundus School the access-for-all objective of the digitalization strategy has been reached. However, from a one-school-for-all perspective the digitalization strategy can lead to the consequence that students with special needs or students who have problems with keeping up (in other words students who would benefit from features like text-to-speech) are at risk of lagging even further behind their peers. The fulfillment of the second focus area of the digitalization strategy risks making the study situation worse for students with special needs in various ways.

Screens, headphones, and mobile phones are semiotic resources in the digitalized classroom, tools for mediating communication and in that sense tools for languaging. The students are *doing* identity (Bagga-Gupta et al., 2017), i.e., the students are constantly involved in identity-positioning-in-practice.

Irrespective of whether the students are listening to music, watching music videos, or browsing web shops, it is not a pedagogic activity. Digital tools as entertainment will be presented in the following sub-section.

The entertainment discourse

From an interview with a student 27 May 2018:

[Me] Do you use the computer much at home? [Student] Yes. [Me] What do you use it most for then? [Student] Well... It's homework... assignments, and then I also play some.⁴¹

Excerpt 5. At home the student use digital tools for playing computer games.

The digital tools are part of the students' historical bodies. They have grown up with digital tools. However, the digital tools are internalized in the historical bodies as tools for leisure and entertainment, not only as tools for education, which is highlighted in Excerpt 5. The student in Excerpt 5 recounts a view of digital tools that is shared with many other students. The digital tools at home are used for education; entertainment is, however, at least as important. Thirty-five to 40 percent of the Swedish 13- to 17-year-old boys interviewed in 2018 played computer games for three hours or more per day (Public Health Agency of Sweden, 2021).

The combination of the digital tools as identity markings and a lack of digitalized pedagogic content (Heath, 2016) risks leading to extensive cyberslacking, i.e., “the wasting of time [...] by entertaining oneself on the Internet when one should be working” (Lavoie & Pychyl, 2001, p. 432). This is of course nothing new (e.g. Gerow et al., 2010; Hatakka et al., 2013; Marron, 2000). The unauthorized use of the digital tools, however, results in already marginalized students being at risk of lagging more behind the other students as multitasking has been proven to have a negative effect on learning (Sana et al., 2013). As we have seen, it is the compensatory features, i.e., text-to-speech, that are dropped when the student in Figure 22 is watching music videos. The digital tools are always at hand on the students' desks, and if they do not want to show the teacher what they are doing they just turn the iPad or laptop away, as is illustrated in Figure 25. The student on the right in Figure 24 and Figure 25 is an example of how students have developed strategies for fooling the teacher that they are working, when they in fact are cyberslacking (Gustafsson et al., 2014).

⁴¹ In original: [Jag] Använder du datorn mycket hemma? [Eleven] Ja. [Jag] Vad använder du den till då framför allt? [Eleven] Ja... Det är väl hemarbete... uppgifter, och sen en del spelar jag ju också.

As we have seen in several of the discourse cycles above, the students are engaged with the digital tools. With the digital tools at hand, the students control their mediating tools for learning. Irrespective of whether the engagement is encouraged by the teacher or not, the digital tools redistribute agency from the teacher to the students, which will be highlighted in the next sub-section.

The agency redistribution discourse

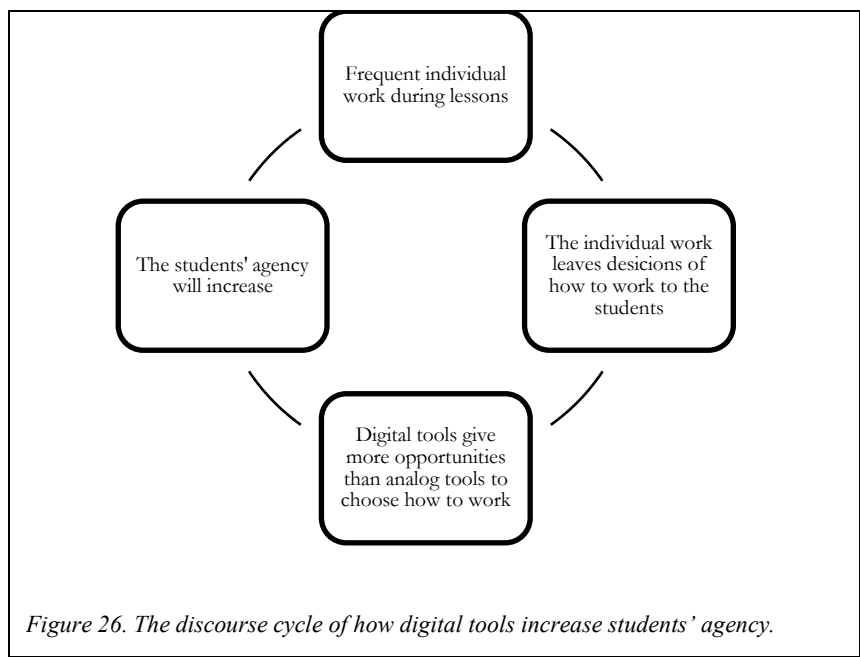




Figure 27. Digital tools encourage cooperation.

From an interview with a student 15 April 2016:

I paint a lot. Like this around my notes, so I can remember it. So I have colors everywhere and I change colors in the texts, and I... in bulleted points, flowers. And like this. Then I put videos if it is... or sound files like if it is something I read aloud so I record it so I can hear it.⁴²

Excerpt 6. Student is working multimodally.

The digital tools distribute agency from the teacher to the students. In classroom activities where the students can use the digital tools, they take control over the interaction order and their mediating tools for learning. Digital tools are considered to give more freedom and opportunities than analog tools, something that the interviewed students, for example the student in Excerpt 6, account for. Digital tools offer the students power to form their learning and widen their sources of information beyond their textbooks. The

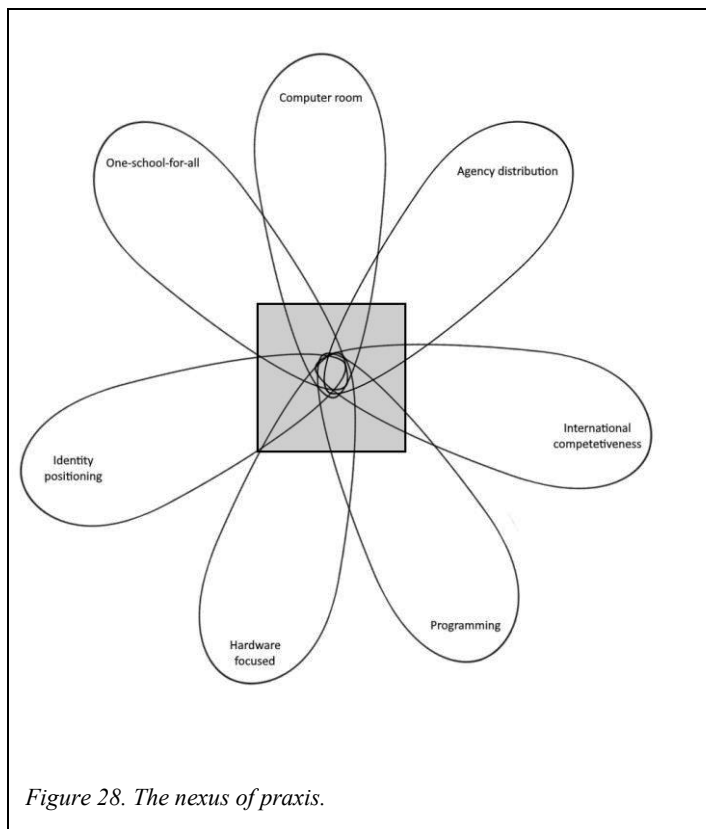
⁴² In original: Jag målar väldigt mycket. Liksom så här runt mina anteckningar, så att jag ska komma ihåg det. Så jag har färger överallt och jag byter färger i texterna, och jag... i punkter, blommor. Och liksom så här. Sen lägger jag in videos om det är... eller ljudfiler liksom om det någonting jag läser upp så spelar jag in det så jag kan höra det liksom.

student in Excerpt 6 explains how she is using the multimodal features of the iPad for enhancing her learning. Generally, the students appreciate working multimodally, as it both facilitates learning and increases their experience of agency in the classroom. The relation between digital tools and student agency has been a part of the students' historical bodies and the anticipatory action is that digital tools increase students' agency vis-à-vis the teachers (See Figure 26. The discourse cycle of how digital tools increase students' agency.).

Gaining agency could facilitate learning. On one hand, the increased agency can lead to decreased learning when the students are watching YouTube videos as a distraction, which is highlighted in Figure 22. On the other hand, YouTube can also be used to facilitate learning, for example when interviewed students recount how they take control over their own learning by watching YouTube videos as a complement to the textbooks. As we have seen in the "Compensatory tools – one-school-for-all discourse" sub-section, digital tools offer agency to students with special needs, who can keep up with their peers. In the visited classrooms, the students often cooperated with each other in lesson phases where they could use digital tools, which is illustrated in Figure 27. This is in line with a study of 23 one-to-one schools where Andersson et al. (2016) show how students like to share laptops when they are working in groups. To use Wertsch et al. (1993) words, the student's agency *extends beyond her skin* when the student sitting to the right closes her computer, lends a pencil to her peer to the left, and they start working on the assignment together. They are also sharing one pair of headphones to listen to the digitalized textbook. In other words, the digital tools facilitate agency-in-interaction with peers and can facilitate inclusiveness in the community of classroom practice.

Seven discourse cycles have now been presented and discussed. They are circulating in different temporal and spatial spaces, sometimes overlapping, sometimes running parallel, and sometimes separated both spatially and temporally. In the following section these discourses in place will intersect in the nexus of praxis. In other words, in the next section the nexus analysis *per se* will be conducted.

The nexus of practice



As we have seen in the nexus analysis section, the discourse cycles intersect in the nexus of practice (Figure 28). In such a complex process as the digitalization of the school system, many discourses circulate. By highlighting some of the crucial one-school-for-all discourses circulating in the implementation of the governmental strategy to digitalize the Swedish school system across time, with temporal scales varying from lesson moments to processes taking several years some general conclusions can be drawn.

Earlier in this thesis, three research questions were formulated:

- Which discourses in place, framed by the one-school-for-all discourse, were circulating across time in the shaping of the Swedish digitalization strategy?

- Which discourses in place, framed by the one-school-for-all discourse and with a special focus on digital tools and classroom interaction orders, were circulating among secondary students before the enactment of the Swedish digitalization strategy?
- Which discourses in place, framed by the one-school-for-all discourse and with a special focus on issues of identity and inclusion, circulate or were circulating in a secondary classroom after the enactment and in the implementation process of the governmental digitalization strategy?

In this section we return to these questions and provide answers.

Two temporal phases of the digitalization of the Swedish school system can be discerned in this thesis. The first phase covers the temporal space until the enactment of the digitalization strategy in 2017. The second phase covers the temporal space from the enactment of the digitalization strategy 2017, i.e., the implementation process of the digitalization strategy. The first two research questions are mainly related to the first temporal phase, and the third research question is mainly related to the second temporal phase.

The Swedish digitalization strategy rests on three focus areas; digital competence for all, equal access to digital tools, and research and evaluation of the possibilities of the digitalization. The first focus area could be considered pedagogical, the second infrastructural, and the last an insurance for a long-term perspective. Two out of three focused areas of the digitalization strategy could thus be considered to have a point of departure in the one-school-for-all discourse: digital competence for all in the school system, and access to digital tools for all in the school system. However, as this thesis highlights the second focused area is more prominent in the implementation process of the digitalization strategy. The fulfillment of the second focused area is a prerequisite for the first – there must be access to digital tools if everyone is to receive competences to use them. However, it is also easier to buy digital tools, than to argue for pedagogical change. Further, in the new public management discourse, as we have seen, another umbrella discourse guides the Swedish school system. Here key figures like computer per student ratios are important, and convenient for comparing or funding. From the teachers' perspective however, there are still uncertainties regarding what the digitalization of school is supposed to contribute pedagogically. The outcome is that today, the students to a large extent have ubiquitous access to

digital tools, but they are working in the same way as prior the enactment of the digitalization strategy. This is in line with Kozma (2008), who argues that strategic policy must be complemented by operational policy, where curricula and pedagogical change are crucial. The digitalization strategy resulted in curricular change. However, as the pedagogical considerations are left to the discretion of individual teachers in Sweden, the government does not suggest any pedagogical changes. Many teachers feel deserted when they are provided with digital tools, and nothing more than that (Ekberg & Gao, 2018).

Three sub-discourses of the one-school-for-all discourse have been explicitly highlighted in the thesis. The *first* sub-discourse is digital tools as compensatory tools for students with special needs. Before the enactment of the digitalization strategy, students with special needs were the only students with ubiquitous access to digital tools. This could be stigmatizing. However, they found the digital tools helpful in order to keep up with their peers. After the enactment of the digitalization strategy, the students with special needs lost their prerogative to use certain digital tools like laptop computers and iPads, and they risk once again lagging behind their peers. When all students use digital tools, the tools became tools for identity positioning. Students use valuable lesson time to watch YouTube videos and browse web shops during the lessons. If these students are considered to have special needs, such distractions could cause them to lag further behind their peers.

The *second* sub-discourse of the one-school-for-all discourse is digital tools as mediators for out-leveling lack of gender equality. An early introduction of digital tools in school, is understood as providing girls with opportunities to get interested in technology, and later in life choose a (well paid) engineering career. Further, digital tools are supposed to increase the boys' engagement in their education. Both girls and boys thus, are seen as having their identity positions mediated with digital tools. However, there is no evidence that ubiquitous access to digital tools increases the girls' interest in technology, or the boys' interest in school. On the contrary, in Secundus School, it is the boys who spend most time with non-school related activities during the lessons, and of the students in the interviews who express that they prefer paper, pen, and textbooks, all are girls.

The *third* sub-discourse of the one-school-for-all discourse is school provided digital tools as mediators for out-leveling a lack of socioeconomical equalities. The school provided digital tools indeed give the socioeconomical weaker

students access to tools that they otherwise could not afford. However, as students with better socioeconomical circumstances bring *personal* digital tools to school, the socioeconomical weaker students continue to be marked. Digital tools are used more as tools for mediating social interaction, relations, and identity positioning, than in terms of pedagogical tools.

In the shaping processes of the digitalization strategy, this thesis has highlighted how the one-school-for-all discourse is discursively entwined with other discourses. Programming became a part of the digitalization strategy with the rationale that it is important that all students have an equitable digital competence, and therefore the same basic requirements for the future labor market. The labor market discourse was also entwined with a gender equality sub-discourse. If programming would be a part of the curriculum, girls would be interested and hopefully attend higher technological education, and boys would hopefully be more engaged in school. In other words, the programming discourse became a part of the first focused area of the digitalization strategy – digital competence for all.

The hardware focused discourse was entwined with the one-school-for-all discourse in the shaping processes of the digitalization strategy. The policy makers recognized the unequal access to digital tools in the Swedish educational system. The one computer per student ratio was low, especially at the compulsory school level. However, at the same time there were examples of schools, or classes within a school, where the students had ubiquitous access to digital tools. Of the five schools that are part of project DIP, the only students that had ubiquitous access to digital tools before the enactment of the digitalization strategy, were the students in Secundus school and one class in Alpha School. Hence, the hardware focused discourse became an important part of the second focused area of the digitalization strategy – making digital tools accessible for all.

Access to hardware, i.e., computers or tablets, were recurring discourses in all student interviews in two ways: firstly, the students highlighted the importance of the digital tools for students with special needs and secondly, computers and tablets were framed as parts of the school's commission to compensate socioeconomical vulnerable students. Thus, the hardware focused discourse, was again entwined with the one-school-for-all discourse.

After the enactment, and also during the implementation processes of the digitalization strategy, the programming discourse and the agency distribution

discourse continued to circulate. The programming discourse had become a part of the mathematics curriculum, and therefore a part of the curriculum for all compulsory school students, in line with the one-school-for-all intentions in the shaping process of the digitalization strategy. However, the fieldwork observations highlight that mathematics continues to be a subject where digital tools are used sparingly.

When the students have ubiquitous access to digital tools, they also have ubiquitous possibilities to take control over their learning processes (Bergström & Mårell-Olsson, 2018). The interviewed students accounted for how digital tools gave them opportunities to take control over their own learning processes. In other words, agency is taken over and is distributed to the students. The students entwine the agency distribution discourse with the one-school-for-all discourse by highlighting that *all* students, irrespective of prerequisites, would have the same possibilities to shape their learning conditions. From a one-school-for-all perspective this means that every student can use the tool that serves that student's learning in the most appropriate manner. A student with dyslexia for example has the possibility to use the text-to-speech feature of the word-processing program and have the written text read aloud. However, the fieldwork observations highlight that many students had concentration problems related to the work at hand and used considerable lesson time watching YouTube videos or scrolling Spotify playlists. This could affect students with special needs more than their peers, as students with special needs can, to a lower extent afford to lose valuable lesson time.

A recurrent discourse circulating among the interviewed students relates to a focus on the computer room. As the computer room was a way for the school to ensure that all students were offered equal access to digital tools, the computer room discourse can be considered a one-school-for-all discourse. However, students' accounts highlighted that some teachers imply that the students must work more with their assignments than what is possible in the designated time available for groups in the computer room if they want higher grades. Students in Sweden have the possibility to aim for different grade levels by working more or less on their assignments. This means that students must use digital tools at home if they want to aim for high grades. Thus, students discursively entwined the computer room discourse with the socioeconomical aspect of the one-school-for-all discourse.

In the implementation process of the digitalization strategy however, the computer rooms disappeared, and the digital tools became a part of the everyday classroom life. Today, the students in Primus School and Secundus School have ubiquitous access to laptop computers, and all students in Alpha School have ubiquitous access to iPads. Digital tools have become what Garcia et al. (2018, p. 413) call “invisible”, i.e., students and teachers do “not ‘count’ the forms of technology that proliferate in school and society today”. Garcia et al. (2018) highlight the lack of research on what classroom technology means for students’ identity positionings. This thesis has shown that when digital tools become invisible, in the sense that they are no longer considered something out of the ordinary, or something you access in a special “room” like the computer room, the students turn the digital tools to something *visible* in the sense that they use digital tools for languaging and doing identity with screen content and headphones. The one-school-for-all agenda turns into an individual identity discourse. When digital tools are mediating identity positionings, they are also mediating power relations between students in the classroom community in that digital tools are mediating socioeconomical and other hierarchical positions. This can also be problematic in the community of students, as digital tools, in this new arena for identity positioning, risks becoming tools for exclusion and marginalization.

Thesis contribution, unexpected insights, and future speculations

The overarching theme for this thesis has been the digitalization of the everyday classroom from a one-school-for-all perspective. By taking a macro perspective of policy processes and a micro perspective of life in everyday classrooms, the thesis highlights both policy intentions and classroom practices. The thesis shows how the one-school-for-all intentions were, to some extent, implemented in classroom practices. Almost all students in secondary schools have today, four years after the enactment of the digitalization strategy, for example equal ubiquitous access to digital tools. However, this thesis has also shown how other important one-school-for-all perspectives have *not* been implemented into classroom practices to the same extent. Four years after the enactment of the digitalization strategy, the discourse continues to be one where the hardware perspective of digitalization dominates instead of a digital competence for all. One important reason for

this discrepancy between policy intention and classroom practice, as highlighted in the thesis, is how the teachers' perspectives have not been taken into account in the implementation processes. The thesis highlights that teachers experience the digitalization process as a top-down process. However, when the teachers experience that they own the digitalization process, digital tools also become pedagogical tools. Therefore, an important conclusion is that a successful digitalization process requires that teachers are involved early in the process.

This thesis also highlights that the digitalization of the school system is not the equivalent of purchasing hardware. Access to hardware is a mere prerequisite for digitalization. As we have seen, the second focus area of the digitalization strategy, equal access for all, has been more prominent than the first focus area, digital competence for all. I will argue that the "real" digitalization process is pinpointed in the first focus area. To have digital competence is to be able to navigate in a digitally infused society, where more and more of our lives transpire and are lived online. To be digital competent is to be able to handle the overwhelming supply of news and products online, to handle harassment on social media, to separate information from commercials, to pay bills online, etc. Because of the digitalization strategy, almost all Swedish curricula were supplemented with writings about digitalization. However, as is highlighted in study 1, curricula are a part of the teachers' historical bodies. In other words, it is not something that can be quickly changed. This is something that this thesis confirms.

In this section, two phases of digitalization of the Swedish school system have been accounted for with the enactment of the digitalization strategy 2017 as the breaking point. However, perhaps we are facing a new, *third*, phase that relates specifically with educational digitalization. The digitalization of the Swedish school system has accelerated considerably on account of the ongoing Covid-19 pandemic. When upper secondary school students were forced to study at a distance in 2020, the teachers were required to transform their lessons from *in situ* to video-based ones using tools like Microsoft Teams, Skype, and Zoom. Mathematics and natural science teachers started live-sending plenary sessions via document cameras in 2020. Tests were conducted online with special test tools. A new discourse in place is thus currently circulating in the Swedish secondary schools: the distance study discourse. Several steps were taken towards, what I earlier called, a "real" digitalization process. The pandemic forced many teachers to adapt new ways

of teaching into their historical bodies. Most of the lower secondary students in Sweden have continued their education *in situ* during the pandemic. However, their teachers were required to prepare for distant education and went through further education in case they too would be required to “go online”. In this thesis we have seen how control over digital tools increases participants agency in the classrooms. Many students experience that they have more control over the classroom interaction order when they use digital tools. The analysis presented in this thesis confirms this. In the wake of the pandemic many teachers experience that they have taken the control over the interaction order of the digitalized education.

The fieldwork-based analysis conducted in project DIP highlights the marginal extent that the ubiquitous digital tools effected the pedagogical work in classrooms. There was a consistency across time, during both temporal phases of digitalization accounted for in this section, in how digital tools were used. They substituted the analog tools as typewriters or dictionaries regardless of whether the space was a computer room or an ordinary classroom. How to use digital tools was a part of the historical bodies of both students and teachers. It was striking though how the ubiquitous accessible digital tools in the second digitalization phase blended with other artifacts that the students deployed, and how digital tools became tools for doing identity in ways that were similar to other artifacts like clothes or haircuts.

However, as we have seen, the lack of digital competence is related to the second focused area of the digitalization strategy: equal access for all. Perhaps the Covid-19 pandemic will turn out to be a catalyst, and promote an increased interest in the first focused area of the digitalization strategy – digital competence for all. This thesis has shown how the Swedish school system has been more and more digitalized in the sense that more and more hardware has entered the classrooms, and more and more advanced software has been incorporated into this hardware. However, pedagogically, digitalization has not made far reaching strides (Haelermans, 2017). Teachers in Secundus School ask themselves what they can gain with all this hardware and software. Research shows that teachers’ attitudes to using digital tools in education is an important factor that shapes their use of digital tools in education (Player-Koro, 2012; Salleh, 2016). Schools do not always know what kinds of digitalization they are supposed to relate to. Ekberg and Gao (2018) show in a study of Swedish secondary school teachers that the latter struggle to integrate digital tools into the curriculum. In a study of Swedish secondary

school teachers, Player-Koro (2012) reports that the most important factor for teachers' positive attitudes to integrate digital tools in education, relates to positive attitudes towards the integration of pedagogical digital tools with students and colleagues. However, she also reports that a general positive attitude to using digital tools in education does not seem to impact the actual integration of digital tools in pedagogical work. Teachers' abilities to use and integrate digital tools in their teaching is also emphasized by students (Fransson et al., 2018). These types of teachers' and students' voices have been corroborated in the findings of this thesis. It is when digital tools are integrated in the learning processes that they are considered an affordance.

Research indicates that when digital tools are used creatively in the classroom, they can facilitate learning. The pedagogical model Write to Learn is one example of a creative way to use digital tools. Genlott and Grönlund (2016) show how students' performance improves in national tests in the areas of literacy and mathematics when the teachers work in line with the Write to Learn model. From a one-school-for-all perspective it is interesting to note that the Write to Learn model seems to be most beneficial for the lowest performing students. However, the digitalization of the school system involves all students. In a study of two Swedish upper secondary schools, known for their large-scale digitalization processes, Pettersson (2021) discusses how digital tools in one of the two schools enables supporting the education in a rural area. In the other school, Pettersson (2021) highlights how digital tools reduces the teachers' administrative burden and facilitates their professional development. Examples of creative usage of digital tools in the studies upon which this thesis rests, from the students' perspective, are when a student watches a YouTube video on how to solve a problem in mathematics, or a student uses a computer simulation to study bridge strength in physics laboratory, or a student who shapes her lesson notes based on her tastes. From a teachers' perspective, the creative usages of digital tools include use of digital laboratory material on lenses, or a language teacher's access to relevant multimodal teaching material. In all these examples, in the present thesis and also what can be seen in some recent scholarship, digital tools are *mediators* for learning and pedagogical ideas. They are not used as digital tools *per se*. This thesis highlights many examples of how digital tools are considered to have a value in themselves. Digital tools are supposed to level gender or socioeconomical inequalities or compensate for various learning problems or disabilities. Digital tools substitute analog tools, not because they are

necessarily better, but because they are digital. This technologic deterministic attitude, i.e., the belief that technology in itself affects society (Selwyn, 2011, 2017), or a *soft* technologic deterministic attitude, i.e., the belief “that technology has a strong influence on social change” (Selwyn, 2017, p. 38), dominates the use of digital tools in schools. Such attitudes are the source of many of the problems identified in this thesis. Therefore, an important conclusion that can be drawn from the studies presented in this thesis, is that a sociocultural perspective on (digital) tools as *mediators* of learning is more fruitful than a technologic deterministic perspective that digital tools *per se* facilitate learning.

In a third (emerging) phase of the digitalization process, new areas of the digitalized society perhaps will be focused and problematized. Here soft areas like digital integrity, digital identity, digital clefts, cyber-bullying, ideological campaigning, surveillance, copyrights etc. will be in focus. In short, this third phase will focus on how we relate to one other and (inter-)act in the digitalized world.

To implement a national digitalization strategy is a complex societal achievement. It involves different temporal, spatial, and social scales. In nexus analysis this complexity is acknowledged and highlighted. Nexus analysis has enabled an analytical tool for bringing the diversity of circulating discourses, interaction orders and the historical bodies of crucial actors together into a comprehensive hub, the nexus of practice. The Swedish context has not seen many nexus analyses used as the analytical framework for illuminating complex societal phenomena. I have strived to contribute to this gap by highlighting how the analytical and methodological framework of nexus analysis can be used to analyze vast and complex societal phenomena with a rich data material.

List of abbreviations

CA	Conversation Analysis
CCD	The research group Communication, Culture, and Diversity
DIP	The research project Digitalization Initiatives and Practices
ICT	Information and Communication Technology
IRE	Initiative Response Evaluation
ITiS	IT i Skolan (IT in School)
PAL	Participation for All?
PCDA	Public Consultative Discourse Analysis

Summary in Swedish

Introduktion

Den svenska skolans digitalisering har en lång historia. Redan 1980 introducerades datorer som en del av läroplanen. Sedan dess har flera omfattande digitaliseringssatsningar genomförts. Själv började jag arbeta som lärare på ungdomsgymnasiet ett år innan satsningen IT i Skolan (ITiS), en satsning som lanserades 1999. En stor del av Sveriges lärare och elever var involverade i ITiS, vilket innebar att lärarna hade tillgång till en egen dator för att använda i undervisningen och eleverna skulle genomföra ett digitaliserat undervisningsprojekt. Eleverna var hänvisade till att arbeta i en datorsal, och det digitala arbetet bestod ofta av att skriva texter i ett ordbehandlingsprogram, och söka efter information på det framväxande internet. Men trots olika satsningar på skolans digitalisering, och trots den ökade digitaliseringen av samhället i övrigt, förändrades arbetet med digitala verktyg i skolan ganska lite. Detta förhållande föranledde regeringen att 2017 besluta om en strategi för att digitalisera hela det svenska skolväsendet. Denna digitaliseringsstrategi, utifrån skolans inkluderande och kompensatoriska uppdrag, det som i avhandlingen kallas *en-skola-för-alla*, är utgångspunkten för denna avhandling.

Syftet med avhandlingen är att undersöka hur skolans kompensatoriska ambitioner ligger till grund för och kommer till uttryck i regeringens digitaliseringsstrategi 2017 och hur detta kommer omsättas i klassrumspraktiken. Avhandlingen omfattar olika skalor, både i rum och tid. Från långsiktiga tidsperspektiv nationellt i policydokument till korta situationer i en klassrumssituation. Studierna som ligger till grund för avhandlingen intresserar sig främst för makro- och mikro-nivåerna, det vill säga på nationell policynivå och lokal klassrumsnivå. Meso-nivån, främst den kommunala förvaltningsnivån, berörs bara flyktigt. Avhandlingen har ett sociokulturellt perspektiv, och nexusanalys, ett diskursanalytiskt ramverk med rötter i sociokulturella perspektiv och etnografi, är både ett metodologiskt och analytiskt verktyg.

Avhandlingen utgår från tre forskningsfrågor:

- Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla, cirkulerade över tid vid utformandet av regeringens digitaliseringsstrategi?
- Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla och med särskilt fokus på digitala verktyg och klassrummets interaktionsordning, cirkulerade bland högstadieelever före beslutet om regeringens digitaliseringsstrategi?
- Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla och med ett särskilt fokus på frågor om identitet och inkludering, cirkulerar eller cirkulerade efter beslutet och i implementeringsfasen av regeringens digitaliseringsstrategi?

Forskningskontext

De delar av det svenska skolsystemet som berörs i denna avhandling består för de flesta elever av en obligatorisk nioårig grundskola, följt av en frivillig treårig gymnasieskola.

Skolan har ett kompensatoriskt uppdrag, något som i avhandlingen konceptualiseras som *en-skola-för-alla* (eng. *one-school-for-all*). Det kompensatoriska uppdraget skall genomsyra all verksamhet och alla elever. I avhandlingen identifieras tre huvudsakliga områden där skolan, inom ramen för dess digitalisering, skall verka kompensatoriskt. För det första skall skolan verka kompensatoriskt för elever som har någon form av inlärningssvårigheter, eller som inte har svenska som primärspråk hemifrån. För det andra skall skolan verka kompensatoriskt för elever med sämre socioekonomiska förutsättningar än andra elever. För det tredje skall skolan verka kompensatoriskt för könsbaserade ojämlikheter i samhället.

Dessa tre kompensatoriska områden ligger också till grund för den digitaliseringsstrategi för hela det svenska skolväsendet som regeringen beslutade om 2017. Redan innan beslutet om digitaliseringsstrategin hade många elever med inlärningssvårigheter tillgång till digitala verktyg. Ofta var dessa elever de enda eleverna som skolan försåg med ett digitalt verktyg som de hade ständig tillgång till. Övriga elever var ofta hänvisade till att arbeta i en datorsal som en lärare bokade under lektionstid. Elevernas möjligheter att arbeta med digitala verktyg varierade dock mellan olika skolor, och ibland även inom en och samma skola. Elever som intervjuats inom ramen för denna

avhandling vittnar dessutom om att vissa lärare förväntar sig att eleverna, om de strävar mot de högre betygen i betygsskalan, skall lägga ner mer arbete än vad som är möjligt inom den avsatta tiden i datorsal. Detta exkluderar socioekonomiskt utsatta elever från de högre betygen, då de inte har samma tillgång till digitala verktyg i hemmet.

Skolans digitalisering förväntas minska könsbaserade ojämlikhet. I förarbetet till digitaliseringsstrategin påpekas dels att pojkar generellt sett har sämre skolresultat än flickor, samtidigt som pojkarna har ett större teknikintresse än flickorna. Detta återspeglas i att en majoritet av deltagarna i högre studier är flickor, med undantag för teknikutbildningarna. Genom att göra programmering till en obligatorisk del av läroplanerna för matematikämnet, hoppades man att pojkarnas intresse för skolan och flickornas intresse för teknik skulle öka. Om flickornas teknikintresse ökade hoppades man på en ökad andel kvinnor på universitetens och högskolornas teknikutbildningar. I förlängningen skulle då också andelen kvinnor som arbetar inom den, ofta välbetalda, tekniksektorn öka.

Regeringens digitaliseringsstrategi mynnade ut i tre fokusområden.

1. Digital kompetens för alla i skolväsendet.
2. Likvärdig tillgång och användning.
3. Forskning och uppföljning av digitaliseringens möjligheter.

De två första fokusområdena kan anses ligga inom ramen för en-skola-för-alla, där det andra fokusområdet är en förutsättning för det första. Det tredje fokusområdet syftar till kvalitet och långsiktighet i skolans digitaliseringsstrategi.

För många skolor innebar beslutet om digitaliseringsstrategin att de i implementeringsprocessen blev tvungna att förse eleverna med digitala verktyg. Med andra ord koncentrerade de sig i första hand på det andra fokusområdet, likvärdig tillgång och användning. Mellan 2015 och 2018 minskade antalet elever per dator från 1,9 till 1,3 på grundskolans senare år. Men då digitaliseringsstrategin inte medförde några extra ekonomiska bidrag till skolorna, innebar inköpen av digitala verktyg stora kostnader för de enskilda skolorna, kostnader som ofta belastade budgeten för läromedel. Således ökade andelen digitala verktyg på bekostnad av analoga läromedel, vilket innebar att de digitala läromedlen ofta fick fungera som substitut för analoga läromedel.

Begreppet *digital kompetens*, som framhålls i digitaliseringsstrategins första fokusområde, är inte entydigt. Men de flesta är överens om att digital kompetens inte bara innebär att man vet hur de digitala verktygen fungerar, utan att man också kan använda de digitala verktygen på ett kreativt sätt och att man kan orientera sig i ett digitaliserat samhälle. Det första fokusområdet har dock inte fått samma genomslag som det andra. Dels beror det på att likvärdig tillgång till digitala verktyg är en förutsättning för att kunna utveckla en digital kompetens, dels beror det på att många lärare känner sig osäkra på hur de skall utveckla digital kompetens inom sina ämnesområden. Det finns en stor efterfrågan på fortbildning, och lärare jag talat med i samband med fältstudierna har svårt att se nyttan med de digitala verktygen som eleverna har med sig till undervisningen.

Teoretiska utgångspunkter

Denna avhandling utgår från ett *sociokulturellt perspektiv*. Utgångspunkten för ett sociokulturellt perspektiv är att människan är en social varelse, att allt hon gör, inklusive lärande, sker i interaktion med andra. Då lärande ur ett sociokulturellt perspektiv är ett resultat av interaktion med andra, utvecklas således lärande såväl i formella sammanhang, som i skolan, som i informella sammanhang. All handling är ur ett sociokulturellt perspektiv medierad med hjälp av *medierande verktyg*. Verktygen kan vara fysiska, till exempel datorer, och brukar då benämnas *artefakter*. Verktygen kan också vara *intellektuella*. Det viktigaste (intellektuella) verktyget är språket. Språk är alltså ett verktyg för att mediera något man vill kommunicera till andra. Det finns dock många olika sätt att kommunicera något till andra, och för att framhäva att kommunikation kan använda olika modaliteter, till exempel kroppsspråk eller bilder, används i denna avhandling begreppet *språkande* (eng. *language*) för att inte blanda ihop begreppet ”språk” med namngivna språk som svenska eller engelska.

Språk och språkande är viktiga för att bygga upp en *identitet*. Ur ett sociokulturellt perspektiv är också identiteten något som byggs upp i interaktion med andra och med hjälp av medierande verktyg. Detta medför att även digitala verktyg kan mediera identitetsskapande.

I denna avhandling är begreppet *agens* viktigt, och även detta begrepp definieras utifrån ett sociokulturellt perspektiv som något relationellt, alltså

ett statusförhållande mellan två, eller flera, aktörer. En lärare kan exempelvis ha mer agens än eleverna.

Som analytiskt och metodologiskt ramverk används i denna avhandling *nexusanalys*. Nexusanalys är utvecklat av Ron och Suzie Wong Scollon och är i grunden en diskursanalys med rötter både i ett sociokulturellt perspektiv och etnografi. Analysenheten i nexusanalys är *social handling*, där den sociala handlingen är skärningspunkten, *nexus*, mellan *situationens diskurser* (eng. *discourses in place*), *historisk kropp* (eng. *historical body*) och *interaktionsordningen* (eng. *interaction order*). Situationens diskurser kan både vara användning av språk i interaktion med andra, och kommunikation med andra modaliteter i enlighet med som ovan definierats som språkande. Historisk kropp är aktörens samlade erfarenheter. Interaktionsordning är den ordning i vilken handlingar sker, men också vilken hierarkisk ordning handlingarna har. En diskurs genomgår en *diskurscykel* (eng. *discourse cycle*), där dess historia påverkar nuet, som i sin tur bildar en förväntan om framtiden.

En nexusanalys inbegriper tre aktiviteter, *engagera praktikens nexus* (eng. *engage the nexus of practice*), *navigera praktikens nexus* (eng. *navigate the nexus of practice*) och *förändra praktikens nexus* (eng. *changing the nexus of practice*). I den första aktiviteten, *engagera praktikens nexus*, identifieras centrala diskurser och aktörer. Den andra aktiviteten, *engagera nexusens praktik*, består av två delar, kartlägga (eng. *mapping*) och ringa in (eng. *circumferencing*) diskurscyklerna. Att kartlägga diskurscyklerna innebär att skapa en karta över de diskurser som cirkulerar i den sociala handlingen. Att ringa in diskurscyklerna innebär att identifiera diskurscyklernas historia och förväntade framtid. Att *engagera nexusens praktik* är den mest omfattande delen av en nexusanalys. Den sista aktiviteten av en nexusanalys, *förändra praktikens nexus*, utgår från att ingen, varken forskare eller studieobjekt, förblir oförändrade av en nexusanalys.

Då nexusanalys utgår från en mångfald av diskurser, har ett både historiskt och framtida perspektiv, och kan röra sig över olika rumsliga dimensioner, är det ett analytiskt ramverk som lämpar sig väl för studier av komplexa samhällsfenomen som utbildning. I Sverige har dock ett relativt litet antal nexusanalyser genomförts, där de flesta genomförts inom lingvistik och språkutbildning. I ett litet fåtal doktorsavhandlingar har nexusanalys använts. Denna avhandling strävar mot att fylla denna lucka.

Metodologi och analysprocess

Det forskningsprojekt som mynnar ut i denna avhandling är etnografiskt inspirerat. Datamaterialet som ligger till grund för denna avhandling består av policydokument, elevintervjuer, videoobservationer, ljudupptagningar, digitalfoton, fältanteckningar och klassrumsartefakter. I ett etnografiskt arbete kan inte, och således inte heller i nexusanalys, datainsamlingsprocessen skiljas från analysprocessen. De tre aktiviteterna i nexusanalysen skall inte ses som en sekvens, utan som sammanvävda processer.

För att besvara den första forskningsfrågan, ”Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla, cirkulerade över tid vid utformandet av regeringens digitaliseringsstrategi?”, genomfördes en *Offentlig konsultativ diskursanalys* (eng. *Public Consultative Discourse Analysis, PCDA*) av policydokument som låg till grund för regeringens digitaliseringsstrategi. I en PCDA analyseras sex egenskaper hos policydokumentet: 1) Vilka deltagare som ligger bakom dokumentet. 2) Vilken agens som aktören bakom kan bedömas ha. 3) Vilket lexikogrammatiskt språk som har använts. 4) Vilka retoriska argument som har använts. 5) Vilka genrer som har använts. 6) Vilka modaliteter som har använts i dokumentet. Dessa sex egenskaper ramas in av fem analytiska dimensioner: Dokumentets funktion, inramning, design, författar-/läsarposition och interdiskursivitet. Med utgångspunkt i regeringsbeslutet ”Uppdrag att föreslå nationella it-strategier för skolväsendet” (2015) spårades policydokumenten bakåt i tiden utifrån deras referenser. Varje spårat policydokument genomgick en PCDA. I analysen framträdde tre teman: policydokumentens sammanlänkade karaktär, ett skifte från en diskurs om digital kompetens, samt att olika policydokument har olika agens. Analysen användes senare för att identifiera centrala aktörer, situationens diskurser samt kartlägga och ringa in diskurscykler på makronivå.

För att besvara den andra forskningsfrågan, ”Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla och med särskilt fokus på digitala verktyg och klassrummets interaktionsordning, cirkulerade bland högstadieelever före beslutet om regeringens digitaliseringsstrategi?”, genomfördes semistrukturerade intervjuer med 31 elever i årskurs 8. De första 8 intervjuerna genomfördes hösten 2015 som pilotintervjuer på de två skolor i en mindre kommun som i avhandlingen kallas Primusskolan och Secundusskolan. Syftet med pilotintervjuerna var att bygga upp en

intervjuguide till de 23 intervjuer som våren 2016 genomfördes på de skolor i en mellanstor kommun som i avhandlingen kallas Alphaskolan, Betaskolan och Gammaskolan. Alla intervjuer spelades in och transkriberades ordagrant. Transkriptionerna bildade sedan underlag för analysprocessen där intervjuerna lästes flera gånger för att identifiera återkommande teman. Transkriptionerna användes också senare för att identifiera centrala aktörer, situationens diskurser samt kartlägga och ringa in diskurscykler på mikronivå.

För att besvara den tredje forskningsfrågan, ”Vilka situationens diskurser, diskursivt sammanflätade med diskurser om en-skola-för-alla och med ett särskilt fokus på frågor om identitet och inkludering, cirkulerar eller cirkulerade efter beslutet och i implementeringsfasen av regeringens digitaliseringsstrategi?”, genomfördes under läsåren 2017/2018 och 2018/2019 fältstudier på den skola som i avhandlingen kallas Secundusskolan. Secundusskolan ligger i en mindre kommun i södra Sverige och är en av två 7- till 9-skolor i kommunen (Primusskolan är den andra). En klass följdes under hela skoldagar när eleverna gick i årskurs 7 respektive 8. Secundusskolan har bedrivit ett iPad-projekt sedan 2012, och det första läsåret, när eleverna gick i årskurs 7, hade alla elever tillgång till en iPad. I årskurs 8 hade eleverna i stället tillgång till en laptop. Orsaken till bytet av digitalt verktyg uppgavs vara att det var lättare att möta de krav som ställdes i samband med implementeringen av regeringens digitaliseringsstrategi. De flesta lektionerna under fältdagarna videofilmades. De lektioner som inte videofilmades var lektioner i årskurs 7 där eleverna blandades med elever från parallellklassen. I analysprocessen gick videomaterialet igenom flera gånger och kommenterades skriftligt. Delar som bedömdes centrala genomgick en detaljerad analys i enlighet med riktlinjerna inom *konversationsanalys* (eng. Conversation Analysis, CA). Videomaterialet kompletterades med fältanteckningar, ljudupptagningar, digitalfoton och klassrumsartefakter för att skapa en så mångsidig bild som möjligt. Fältstudierna bidrog till att identifiera situationens diskurser samt kartlägga och ringa in diskurscykler på mikronivå. I fältstudierna kunde också interaktionsordning, identitetsskapande och inkludering studeras *in situ*.

Vetenskapsrådets etiska riktlinjer har följts. För att skydda elevernas integritet har inte idrottslektionerna videofilmats. De elever som inte har velat bli filmade har erbjudits att placera sig utanför kameravinkeln. Alla deltagare har avidentifierats, och gjorts oigenkännliga i illustrationer i avhandlingen och de enskilda studierna.

Resultat

Sju situationens diskurser där skolans digitalisering diskursivt har sammanflätats med en-skola-för-alla har kartlagts och ringats in.

Datorsalsdiskursen. Innan regeringen fattade beslutet om digitaliseringsstrategin 2017 var datorsalen en återkommande diskurs bland eleverna. Det var i första hand i datorsalen som de kom i kontakt med de digitala verktygen. Datorsalen gav möjlighet att erbjuda alla elever tillgång till digitala verktyg på lika villkor, och var på så sätt diskursivt sammanflätat med en-skola-för-alla.

Programmeringsdiskursen. Programmeringsdiskursen blev relativt sent en del av bakgrundsarbetet till digitaliseringsstrategin. Diskursivt sammanflätad med en-skola-för-alla var programmeringsdiskursen, som framkommit ovan, ett uttryck för att ge både pojkar och flickor samma förutsättningar både i skolan och senare i livet. I bakgrundsarbetet till digitaliseringsstrategin var dock en annan diskurs diskursivt sammanflätad med programmeringsdiskursen: den internationella konkurrenskraften. Genom att utbilda elever i programmering, var tanken att svensk konkurrenskraft skulle stärkas inom en sektor som bedöms bli allt viktigare.

Diskursen om kompensatoriska hjälpmedel. Som framgått ovan ansågs digitala hjälpmedel redan före beslutet om digitaliseringsstrategin vara så viktiga för elever i behov av särskilt stöd, att dessa elever ofta var de enda som hade ständig tillgång till digitala verktyg i skolan. De intervjuade eleverna, före beslutet om digitaliseringsstrategin, som har särskilda behov hade samtliga ständig tillgång till digitala verktyg. Dessa elever redogör för att de digitala verktygen är centrala för deras möjligheter att följa med i samma takt som sina klasskamrater. De digitala verktygen kunde dock verka utpekande då ständig tillgång till digitala verktyg förknippades med behov av stöd. I samband med implementeringen av digitaliseringsstrategin fick samtliga elever tillgång till digitala verktyg, vilka då inte längre är utpekande. Dock förlorar de elever som är i behov av stöd det försprång som de digitala verktygen kan ge dem i förhållande till sina klasskamrater när samtliga elever i klassen har tillgång till digitala verktyg.

Hårdvarufokuserad diskurs. Implementeringen av digitaliseringsstrategin blev i hög grad en hårdvarufokuserad diskurs. Som framgått ovan var det i många skolor i datorsalen som eleverna arbetade med digitala verktyg. För att

kunna uppnå målsättningen med digitaliseringsstrategins andra fokusområde, likvärdig tillgång till och användning av digitala verktyg, koncentrerades ansträngningarna till att införskaffa mer hårdvara i form av datorer eller surfplattor.

Identitetsdiskursen. I implementeringsprocessen av digitaliseringsstrategin fokuserades mer på strategins andra fokusområde, likvärdig tillgång och användning, än på det första fokusområdet, digital kompetens för alla. Eleverna utrustades med digitala verktyg utan att detta föregåtts av en diskussion om hur de digitala verktygen kunde fylla en pedagogisk funktion. Eleverna hade dock tillgång till de digitala verktygen i klassrummet, och dessa verktyg blev en lika vanlig artefakt på bänkarna som papper, penna och lärobok. Verktyg medierar identitet, så även digitala verktyg. I sitt identitetsskapande använder eleverna datorer för att visa upp sin musiksmak med hjälp av spellistor och musikvideor, eller visa upp sina fritidsintressen och sitt klädmode med webbshoppar. Eleverna använder också personliga digitala verktyg, såsom mobiltelefoner och hörlurar, som medierande verktyg för identitet och personlig smak. Då alla elever har lika tillgång till de digitala verktyg som skolan tillhandahåller kompenserar dessa verktyg socioekonomiskt utsatta elever. De personliga digitala verktygen verkar dock exkluderande för de socioekonomiskt utsatta eleverna som får hålla till godo med skolans lågstatushörlurar, eller inte använda hörlurar alls.

Underhållningsdiskursen. I många elevers och lärares historiska kroppar har de digitala verktygen inte integrerats som en naturlig del av det dagliga klassrumsarbetet. Däremot är de digitala verktygen en del av många elevers historiska kropp som ett underhållningsmedierande verktyg. Eftersom eleverna också tar med sig de digitala verktygen hem upplöses distinktionen mellan skola och hem. Således används de digitala verktygen också i skolan för underhållning. Ur ett kompensatoriskt en-skola-för-alla-perspektiv kan detta vara problematiskt då flera observationer under det fältarbete som ligger till grund för denna avhandling tyder på att det är de elever som är i störst behov av att kunna arbeta fokuserat under lektionerna som använder de digitala verktygen i underhållningssyfte.

Agensdiskursen. Många elever upplever att de digitala verktygen ger dem kontroll över sitt lärande. De kan i högre grad välja väg för inhämtande av kunskap, ofta multimodalt i form av exempelvis instruktionsvideor. De skapar också multimodalt genom videoproduktion eller grafiskt utformade

anteckningar. Agens är dock ett relationellt förhållande, och elevers ökade agens kan ske på bekostnad av lärarens. Konflikter om vem som skall ha kontroll över klassrummets interaktionsordning bottnar ofta i kontroll över de digitala verktygen.

Diskussion och slutsatser

Nexusanalys möjliggör analys av komplexa samhällsfenomen som sträcker sig över olika skalor i tid och rum. I denna avhandling har nexusanalys möjliggjort en analys av hur policyskapande intentioner på makronivå omsätts i klassrumspraktik på mikronivå. Avhandlingen visar hur andan i en-skola-för-alla genomsyrat både policyprocess och klassrumsarbete. Dock har skolan inte alltid nått ända fram i klassrumspraktiken. Temporalt bildar beslutet om digitaliseringsstrategin 2017 ett före och ett efter. Studierna som ligger till grund för denna avhandling visar att den stora skillnaden före och efter detta beslut består i att datorsalarna försvann och eleverna fick ständig tillgång till digitala verktyg. Hur dessa verktyg används i undervisningen har dock inte förändrats i så hög grad. I stället medierar de digitala verktygen annat, som identitetsskapande eller underhållning. I avhandlingen argumenteras för att detta kan bero på att mycket fokus har lagts på digitaliseringsstrategins andra fokusområde, lika tillgång och användning, och mindre fokus på det första fokusområdet, lika digital kompetens. Digitala verktyg har införts i klassrummet mer för att de är digitala än att de är verktyg. Det förekommer både bland dem som förespråkar och dem som är skeptiska till digitala verktyg i skolan en tro på att det är de digitala verktygen *i sig* som påverkar undervisning och lärande, alltså en *teknikdeterminism*. Digital kompetens är att kunna använda digitala verktyg på ett kreativt sätt, och många lärare och elever använder digitala verktyg kreativt. Både de studier som ligger till grund för denna avhandling och annan forskning visar att genom att använda digitala verktyg på ett kreativt sätt kan de främja lärande. I dessa fall är de digitala verktygen medierande verktyg för lärande.

När detta skrivs har skolan erfårit cirka halvtannat år av anpassningar i samband med Covid 19-pandemin, och mycket tyder på att skolans digitalisering har accelererat under denna tid. Kanske är pandemin en katalysator för att påskynda uppfyllandet av digitaliseringsstrategins första fokusområde, lika digital kompetens, och främja utvecklingen mot att se

digitala verktyg som *medierande verktyg*, något som främjar lärandet och komma ifrån en *teknikdeterministisk* syn på de digitala verktygen.

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Appendix 1. Agreements of consent

Agreement of consent for the interview study



Forskning i skolan

Jag vill med hjälp av dig och ditt barn förbättra den svenska skolan! Jag skulle vara mycket tacksam om du kunde tillåta mig att intervjua ditt barn om hur 15-åringar använder ny teknik. Det gäller främst datorer av olika slag – också till exempel mobiltelefoner. Intervjun tar ca 30 minuter. Den görs på skolan med tillstånd också från rektor och lärare.

Den som intervjuas kan när som helst avbryta intervjun, eller meddela att hon eller han inte vill ställa upp längre. Inga namn kommer att finnas med, alla som deltar är anonyma. Inte heller skolans eller kommunens namn kommer att nämnas. Intervjuerna kommer att spelas in, och det som är inspelat kommer att skrivas ut. Det är bara jag som ska lyssna på inspelningarna. Endast jag och min handledare professor Tomas Kroksmark ska läsa utskriften. De är alltså konfidentiella.

Om du har frågor eller synpunkter är det bara att höra av sig!

Doktorand Lars Almén
Jönköping University
E-post: alla0987@student.ju.se
Mobiltelefon: [redacted]

Professor Tomas Kroksmark
Jönköping University
E-post: tomas.kroksmark@ju.se

Klipp här ✂

Jag tillåter att min dotter/son deltar i en intervju.

.....
(elevens namn)

.....
(underskrift)

.....
(namnförtydligande)

.....
(datum, ort)

Agreement of consent for the project DIP school

Undersökning om användning av digital teknik i skolan

Jag heter Lars Almén och är lärare på GKC. Jag är också doktorand på Högskolan för Lärande och Kommunikation i Jönköping. Mitt forskningsområde handlar om hur datorer och andra digitala verktyg används av lärare och elever i skolan. Anledningen till att jag skriver detta brev är att jag skulle vilja ha ditt tillstånd till att låta mig sitta med på några av ditt barns lektioner under de kommande terminerna. Under dessa lektioner kommer jag att observera hur datorer och andra digitala verktyg används i undervisningen.

Jag kommer att anteckna och ta bilder med digitalkamera. Dessutom kommer jag att spela in lektionerna med en digital videokamera. Filmerna, anteckningarna och bilderna kommer bara jag och mina handledare, professor Sangeeta Bagga-Gupta och docent Cecilia Bjursell, att ha tillgång till.

Alla som deltar kommer att vara helt anonyma. Skola eller kommun kommer inte att nämnas. Att delta är helt frivilligt, och ditt barn kan naturligtvis när som helst dra sig ur utan att behöva motivera varför.

Mer information hittar du på forskningsprojektet DIPs webbplats (<https://goo.gl/oMK2Zb>).

Om du har frågor eller synpunkter är det bara att höra av sig!

/Lars Almén

Doktorand Lars Almén
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Jönköping University
E-post: Cecilia.Bjursell@ju.se

Klipp här ✂

☐ Jag tillåter att min dotter/son deltar i en studie.

.....
(elevens namn)

.....
(underskrift)

.....
(namnförtydligande)

.....
(datum, ort)

Lämna senast onsdagen 15 november till [redacted] !

Appendix 2. Included articles

Almén, L., & Bagga-Gupta, S. (2019). Inscriptions and Digitalization Initiatives Across Time in the Nation-State of Sweden. The Relevance of Shifts and Continuities in Policy Accounts for Teachers' Work. In S. Bagga-Gupta, G. Messina Dahlberg, & Y. Lindberg (Eds.), *Virtual Sites as Learning Spaces. Critical Issues on Language Research in Changing Eduscapes*. Palgrave Macmillan, Cham

Almén, L., Bagga-Gupta, S., & Bjursell, C. (2020). Access to and Accounts of Using Digital Tools in Swedish Secondary Grades: An Exploratory Study. *Journal of Information Technology Education: Research*, 19, 287-314. <https://doi.org/https://doi.org/10.28945/4550>

Bagga-Gupta, S., Messina Dahlberg, G., & Almén, L. (2021, in press). Gatekeepers and gatekeeping: On participation and marginalisation in everyday life. In Hanna Egard, Kristofer Hansson, and David Wästerfors (Eds.), *Accessibility Denied. Understanding Inaccessibility and Everyday Resistance to Inclusion for Persons with Disabilities*. Routledge.

Almén, L., (work in progress). Inclusion, exclusion and identity positioning in the digitalized classroom: going beyond the “digitalization” in a digitalization strategy

One-school-for-all As Practice

– A Nexus Analysis of Everyday Digitalization Practices

Inclusive and compensatory one-school-for-all dimensions of the 2017 governmental strategy to digitalize the Swedish school system constitute points of departure in this thesis. Three research questions that cover both macro (policy), and micro (classroom) levels, and temporal spaces before the enactment and in the implementation processes of the digitalization strategy, guide the studies presented in this thesis. Framed by a sociocultural perspective and through the use of the analytical and methodological framework of nexus analysis, seven discourses in place have emerged where the digitalized classroom and the digitalization strategy are discursively entwined with the one-school-for-all discourse. The discourses in place include the computer room, programming, compensatory tools, hardware that is focused, identity, entertainment, and agency redistribution. The ethnographic data mainly focuses on secondary school students in grades 7 and 8. It includes policy documents, interviews, classroom video and audio recordings, photos, fieldnotes, and classroom artifacts. The thesis highlights the students' ubiquitous access to digital tools after the enactment of the digitalization strategy. However, digital tools continued to be used to a high extent in similar ways as prior to the enactment of the digitalization strategy. Instead of using digital tools as tools for facilitating learning, the students use them as tools for mediating identity positionings, and for entertainment purposes. The studies upon which the thesis rests illustrate how ubiquitous access to digital tools can be problematic from a one-school-for-all perspective. The thesis argues that one reason why the implementation of the digitalization strategy became problematic relates to the fact that schools focused primarily on the second focus area of the strategy, i.e., equal access of digital tools for all, before they focused on the first area, i.e., digital competence for all. The thesis shows that digital tools are affordances in classrooms when they are used in creative ways.



LARS ALMÉN is a scholar at School of Education and Communication at Jönköping University where he is member of the CCD research team (www.ju.se/ccd), the research project DIP, Digitalization Initiatives and Practices (www.ju.se/ccd/dip) and the LeaDMe team, Learning Digitalization and Media (www.ju.se/ccd/leadme). He also works as upper secondary school teacher. His research interest is the digitalization of education. In his research Almén has focused on policy documents on digitalization of the Swedish school system, pupils' perspectives on digitalization, and marginalization of pupils and teachers in the digitalized classroom.