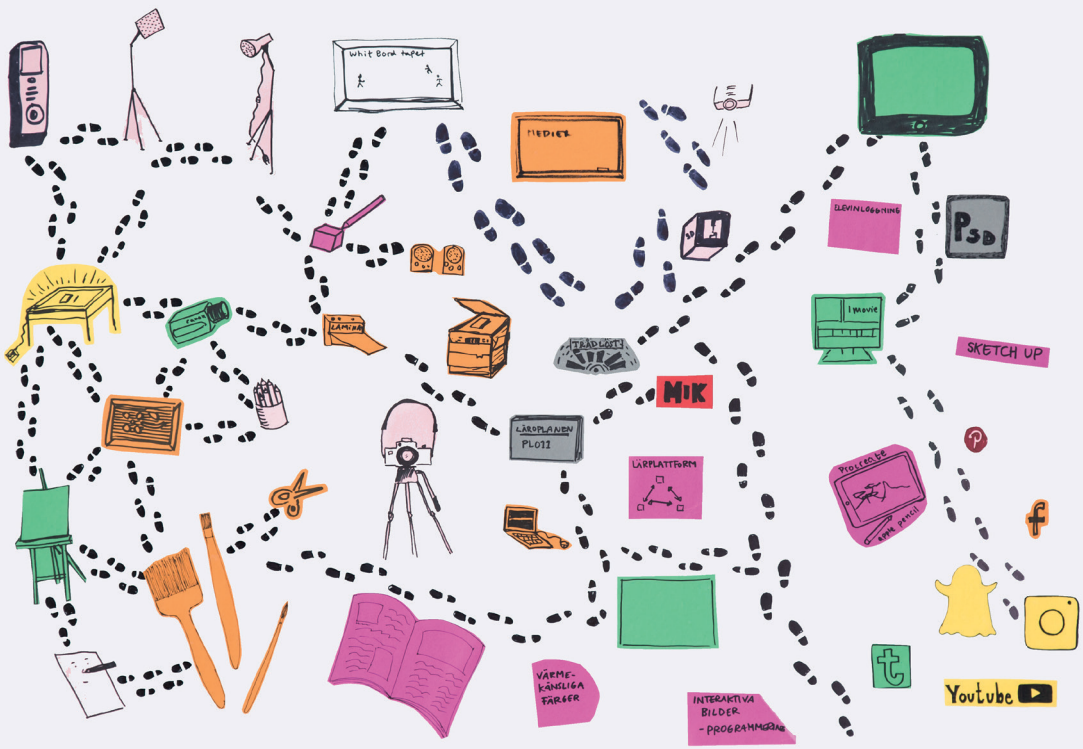
Enabling Media

Infrastructures, imaginaries and cultural techniques in Swedish and Estonian visual arts education

INGRID FORSLER



SÖDERTÖRN DOCTORAL DISSERTATIONS

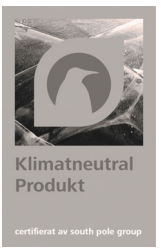
Enabling Media

Infrastructures, imaginaries and cultural techniques in Swedish and Estonian visual arts education

INGRID FORSLER

Södertörns högskola

Subject: Media and Communication Studies
Research Area: Critical and Cultural Theory
School: School of Culture and Education and Baltic and East European Graduate School (BEEGS)



Södertörns högskola
(Södertörn University)
Biblioteket
SE-141 89 Huddinge

www.sh.se/publications

Cover image: Workshop participants
Cover photography: Linda Romppala
Cover layout: Jonathan Robson
Graphic form: Per Lindblom & Jonathan Robson

Printed by Elanders, Stockholm 2020

Södertörn Doctoral Dissertations 172
ISSN 1652–7399
ISBN 978-91-89109-04-9 (print)
ISBN 978-91-89109-05-6 (digital)

Till Nora och Irma

Abstract
This dissertation explores the media environments of visual arts education in Sweden and Estonia and how educators understand, negotiate and enable this infrastructure. Based on the notion that the ongoing digitalization of the educational system in these countries makes established practices appear, it further discusses how visual arts education as a school subject is shaped in relation to different technologies for image making and school administration. The comparative perspective makes visible how these practices have emerged in specific cultural settings, including the historical development of compulsory education and the organization of teacher training in each country. The two-way relation in which media technologies used in education to some extent condition pedagogical practice at the same time as being dependent on the work of educators, is conceptualized in the title as *enabling media*.

Theoretically, the dissertation draws on *infrastructuralism,* suggested by Peters (2015b), as a unifying concept for media studies interested in the logistical qualities of media. By using this perspective to study schools as media environments, the dissertation builds on an established interest within medium theory on the relation between compulsory education and media technologies. This tradition is developed here through theoretical perspectives and concepts from media philosophy, German media theory, infrastructure studies and science and technology studies. To discuss the historical development of visual arts education in relation to embodied techniques and media technologies, the dissertation draws on studies of *cultural techniques* (Siegert, 2015; Winthrop-Young, 2014). Infrastructure theory has further made visible the role of educators in this relation as well as how they make possible certain pedagogical practices through *infrastructuring* (e.g. Bowker & Star, 2002), and also how a sensibility to infrastructures can be facilitated to imagine alterative futures to those put forth in dominating visions of school digitalization, discussed here as *sociotechnical imaginaries* (Jasanoff & Kim, 2015).

Infrastructure studies also informed the methodological approach of this dissertation, a combination of short time ethnographic field work, site visits, interviews, and visual methods such as participatory *future workshops* (Jungk & Mullert, 1987) and *video walks* (Pink, 2007). The aim of the latter interventionist methods of data collection is to make environments appear together with the participants in the study, and to facilitate discussion about mundane conditions and practices. The dissertation also assumes a historicizing perspective to discuss how visions of the future are grounded in

established practices and structures and how memories of the past can function as infrastructures in themselves.

The results of the dissertation indicate that the initiative to make environments visible, conceptualized by McLuhan (1977) as a *figure/ground-shift* and by Bowker and Star (1999) as an *infrastructural inversion*, is something already present in visual arts education. Being a subject that basically deals with vision – the ability to see and foreground architectural spaces, environment and the familiar – the dissertation suggests that it is not only established media literacy competences such as the ability to interpret and create media content that visual arts education can contribute in our contemporary media society, but also the ability to recognize, visualize and reimagine the infrastructures and technologies involved in the distribution of media. This ability is conceptualized here as *infrastructure literacy* (Parks, 2010) and concretized in a tentative curriculum, including lesson plans and assignments designed to facilitate historicizing, explorative and material approaches to media in school art education.

Keywords: visual arts education, teacher training, educational technology, Sweden, Estonia, infrastructures, cultural techniques, sociotechnical imaginaries, visual methods, infrastructural imagination, media literacy, infrastructure literacy.

Sammanfattning
Denna avhandling undersöker relationen mellan medier och skolämnet bild i Sverige och Estland, och hur bildlärare och lärarutbildare förstår, förhandlar och möjliggör ämnets mediemiljöer och infrastrukturer. Med utgångspunkt i att den pågående digitaliseringen av skolan får etablerade praktiker att framträda, diskuterar avhandlingen vidare hur bildämnet som sådant formats i relation till olika tekniker och teknologier för såväl bildframställning som administration. Det komparativa perspektivet synliggör hur dessa praktiker har vuxit fram i särskilda kulturella kontexter, med olika traditioner och historier av skolväsende och lärarutbildning. Den ömsesidiga relation i vilken de medier som används i utbildning villkorar den pedagogiska praktiken, samtidigt som de möjliggörs av det arbete lärare utför i form av anpassningar och tillfälliga lösningar, diskuteras här som *ett möjliggörande av möjliggörande medier*.

Teoretiskt bygger avhandlingen på det perspektiv Peters (2015b) benämner *infrastrukturalism,* nämligen ett intresse för mediers logistiska egenskaper som återfinns i flera medievetenskapliga teoritraditioner. Genom att undersöka skolans mediemiljö ur detta perspektiv bygger studien vidare på ett etablerat intresse för relationen mellan medier och utbildning inom mediumteorin, och utvecklar denna tradition genom teoretiska perspektiv från mediefilosofi, tyskspråkig medieteori, infrastrukturstudier och teknik- och vetenskapsstudier. De olika tekniker, teknologier och material som formar bildämnet historiskt diskuteras här som *kulturtekniker*, ett begrepp hämtat från tyskspråkig medieteori (t ex Siegert, 2015; Winthrop-Young, 2014). Begrepp och teorier från fältet infrastrukturstudier används i sin tur för att synliggöra lärares roll i denna process, och hur de möjliggör olika pedagogiska praktiker genom att interagera med, omförhandla och vidareutveckla ämnets infrastrukturer. Slutligen diskuteras hur denna känsla för infrastrukturer kan användas för att skapa alternativa föreställningar om framtidens skola som skiljer sig från de dominerande *sociotekniska föreställningarna* (Jasanoff & Kim, 2015) om skolans digitalisering.

Infrastrukturstudier har också använts som inspiration i avhandlingens metod, som är en kombination av kortare fältstudier och studiebesök, intervjuer, och visuella metoder såsom kollaborativa, framtidsorienterade workshops (Jungk & Mullert, 1987) och videopromenader (Pink, 2007). Syftet med de senare, mer interventionistiska inslagen, är att skapa situationer där bakgrunden och de förgivettagna aspekterna av vår omgivning synliggörs, för att kunna diskutera dessa tillsammans med deltagarna i studien. Avhandlingen använder sig också av ett historiserande perspektiv för att dis-

kutera hur framtidsvisioner grundar sig i etablerade praktiker och strukturer, och hur minnen och narrativ kan fungera som ett slags infrastrukturer i sig.

Avhandlingens resultat visar att den strävan efter att synliggöra miljöer som präglar det teoretiska ramverket, från det McLuhan (1977) talade om som ett perspektivskifte från *figur* till *bakgrund* till Bowker och Stars (1999) modell för *infrastrukturell inversion,* i viss utsträckning finns representerad också i bildämnet. Med utgångspunkten att ämnet handlar om seende i en utvidgad bemärkelse – förmågan att se och synliggöra rum, miljöer och det förgivettagna – är en slutsats att bildämnet har potential att utveckla en mediepedagogik som, förutom etablerade mediekunnighetskompetenser som att tolka och skapa medieinnehåll, också inkluderar infrastrukturella perspektiv. Avhandlingen visar att ämnet på detta sätt kan bidra med förståelse för hur infrastrukturer organiserar andra medier och praktiker, och med kunskaper om hur dessa system kan synliggöras om omförhandlas. Dessa förmågor konceptualiseras här som *infrastrukturlitteracitet* (Parks, 2010) och konkretiseras i en tentativ läroplan med uppgifter och lektionsupplägg, vars syfte är att inspirera till en mer historiserande, undersökande och materiellt orienterad mediepedagogik inom bildämnet.

Nyckelord: bildämnet, lärarutbildning, utbildningsteknologier, Sverige, Estland, infrastrukturer, kulturtekniker, sociotekniska föreställningar, visuella metoder, infrastrukturell föreställningsförmåga, mediekunnighet, infrastrukturlitteracitet.

Acknowledgments

This dissertation was finished during the same period as COVID-19 spread across the earth, when borders closed, and people were told to self-isolate in their homes. It has been a strange and worrying period and a friend jokingly suggested that the finished book should be labelled with a "Corona sticker" to explain any errors that might have escaped my attention due to a lack of concentration in these turbulent times. While finishing a long-term project during a pandemic might not be ideal, this situation has brought new questions to the fore that involve the relation between education, technology and teachers that are explored in this study. At the time of writing, all universities and secondary schools in Sweden have moved their teaching online, and compulsory education is expected to follow soon (as is already the case in many parts of the world). This new reality seems to make visible for teachers, parents and pupils the extent to which education is conditioned by different media environments. It also causes educators to rethink their teaching to fit online environments and, conversely, to configure these environments to suit their needs and views on what constitutes a good education. Although wishing that this period of uncertainty and fear will pass as soon as possible, I hope that the discussion around these questions will remain and I offer this dissertation as my modest contribution.

This is a study about art educators and their professional knowledge. On a personal level, it is also a symbol of my own professional development from art teacher to university teacher and researcher. After spending the first years of my professional life moving between different short-term teaching positions, with new colleagues and routines at every turn and little time for reflection, the possibility to spend several years concentrating on one thing felt like a luxury. I am very grateful for this opportunity to travel and meet with interesting people, as well as take the time to read, think and write. Most of the time, I have really enjoyed working on this dissertation; other times it has been more challenging. Here, I owe a great debt of gratitude to a number of people who have helped me along the way.

First of all, I would like to thank my primary supervisor Michael Forsman for his commitment and generosity in sharing his knowledge and ideas

in the field of media and education. I would also like to thank my secondary supervisor Staffan Ericson for consistently providing fresh perspectives and being a sympathetic reader. I have cherished the long and intensive conversations that the three of us have had around the manuscript, and their enthusiasm during these meetings has really kept me going.

I am also very grateful for the generous and dynamic research environment at the Department of Media and Communication Studies at Södertörn University, and I would like to give a warm thank you to all colleagues for astute ideas and comments on, and in-between, seminars. A special thank you to Linus Andersson for insightful comments on my 60% seminar, and to Göran Bolin, Johan Fornäs, Carina Guyard, Anne Kaun and Per Ståhlberg for reading and commenting on my final draft. This research environment is also extended through the national media research network for graduate students TRAIN and the international research network Brestolon, and I would like to thank both senior and junior participants at those network meetings for valuable comments and discussions.

There is more to a PhD education than writing a dissertation, and I have been lucky to end up with the kind of colleagues that make you long for the office. Thank you, Jessica Gustafsson, Anne Kaun, Matilda Tudor and Philipp Seuferling for your friendship and for always being prepared to discuss work, life, love and everything in-between, over lunch or in one of our never-ending online conversations. As part of this group I want to thank Carina Guyard in particular, for being my closest friend in academia, and Liisa Sömersalu for sharing not only a room but also sorrows and joys with me, as well as for answering all my questions about Estonian culture and society. In recent years we have also enjoyed the company of Karin Larsson and Isabel Löfgren around the lunch table. Thank you to Peter Jakobsson and Lotta Schwarz for guiding me in me in academia before I even started as a PhD student, and to Julia Velkova for being so generous and inclusive with new ideas and opportunities.

I extend my gratitude to the Foundation for Baltic and East European Studies (Östersjöstiftelsen) for the generous financial support for my studies, and to the Baltic and East European Graduate School (BEEGS) for providing the opportunity for me to get to know PhD colleagues in other subject areas. Among those, I would like to thank Laura Lapinskė, Camilla Larsson, Patrick Seniuk and Raili Uibo for friendship, support and interesting discussions, especially at the start of our education. Camilla has also proven to be a good neighbour with whom I have shared many valuable conversations about the writing process over lunch and coffee.

At Södertörn University, I also want to give a warm thank you to Ewa Rogström, the administrative officer for the research area of Critical and Cultural Theory, for being so helpful and engaged in all aspects of the PhD process, from coursework to proofreading. I have also been involved in different networks and projects with colleagues affiliated with the teacher training, and I am thankful for this opportunity to maintain contact with the teaching profession and prospective teachers.

This dissertation would not be possible without the participants who contributed to this study with their time and knowledge, and I am deeply thankful for their generosity. A special thank you to Eve Kiiler for being my guide to the Estonian visual arts education community and helping me set up workshops for student teachers, and thank you Piret Viirpalu, Lisa Öhman, and Ola Abrahamsson for helping me make contact with students to participate in the workshops and for allowing me to host them at your institutions.

While the participants behind the map on the cover of this dissertation must remain anonymous, I direct a special thanks to you and to all other workshop participants for making these thought-provoking images and letting me use them in this study. Thank you also to Linda Romppala for taking the photograph of the map for the cover, and to Jonathan Robson at the library for the layout and typesetting.

Last but not least I would like to thank my husband Henrik Lindström for his love, support, patience and ability to put things in perspective, and my beloved daughters Irma and Nora for reminding me every day of the importance of engaging in the future of education. I dedicate this book to you.

Contents

Table of figures

CHAPTER 1

Visual arts education in the digitalized school

The image on the cover of this dissertations shows a map of an art classroom. It was created by a group of student art teachers during a workshop performed as part of this study, on the theme "the art classroom of tomorrow". The classroom, as represented in the image, consists of different media technologies: old ones, like brushes, easels, pencils, scissors, and newer ones, like video cameras, 3D pens, tablet computers, and different digital software. The map also contains representations of media systems and infrastructures, both those developed especially for educational purposes like learning management systems and the national curricula, and those originally intended for other contexts, like social media platforms. Taken together, these media make up visual arts education as a subject. But the image also shows something else that connects the various media technologies and systems, namely footsteps, representing the art teacher as someone who makes the media environment of the classroom function. While media technologies might make up the conditions for pedagogical practice, these technologies must also be reconfigured by educators to fit local conditions. Media, in other words, is described in this image, both as *enabling different forms of knowledge production* and as something that is *enabled through practice and manual labour*.

From this point of departure, this dissertation discusses the dynamic between media, education and the teaching profession and how it is played out within the field of visual arts education in Sweden and Estonia. Drawing on a definition of media as *enabling environments* (Peters, 2015a, p. 46), it analyses how visual arts education has been shaped in relation to different technologies as well as how educators understand and negotiate this relation, based on their pedagogical expertise. The dissertation further discusses how the strategies of teachers can inform media literacy initiatives within visual arts education, arguing that the subject carries an unutilized potential to rethink, negotiate and reinvent the imaginaries surrounding media techno-

logies in education. It is carried out as an ethnographically inspired study with elements of visual and experimental methods, in two national settings: Sweden and Estonia.

The conceptualization of media as enabling environments comes from John Durham Peter's (2015b) suggested doctrine of *infrastructuralism* in media studies, that constitutes the theoretical framing of this study. Peters playful term marks an attempt to navigate between the explanatory claims of structuralism and poststructuralism, with its penchant for exceptions, by emphasizing the organizational and structuring nature of contemporary media and taking an interest in "the basic, the boring, the mundane, and all the mischievous work done behind the scenes" (p. 33). As the name indicates, infrastructuralism focuses the larger structures and processes *under*-pinning more visible media practices. Rather than studying the outcomes or the creative learning processes taking place within visual arts education, this theoretical perspective makes it possible to consider the material conditions and invisible work necessary for these processes to take place. As such, it provides a rather fitting perspective to study the mundane and seemingly "boring" realities of compulsory schooling.

But what makes school art education relevant for media and communication studies, and why the cross-national comparison? To begin with, visual arts education is, to a large extent, conditioned by the media technologies used in pedagogical practice. While this can be said about several school subjects, it is especially apparent in visual arts education, which in both Sweden and Estonia has transformed from a skill training subject named *drawing,* to a communication subject combining several image making techniques and genres (Kockum, Alling-Ode, & Lind, 2019; Pettersson & Åsén, 1989; Vahter, 2016, 2018). This communicative turn in visual arts education occurs in parallel with the emergence of research fields such as cultural studies, media and communication studies and children and youth studies, making it a kind of link between media research and the educational sector (Lind & Hasselberg, 2019, p. 206). Indeed, in the previously described map on the cover of this dissertation the acronym MIK, Swedish for Media and Information Literacy (MIL), is placed in the centre of the image, positioning visual arts education as a *media literacy subject.* In addition to this focus on media devices and mass media content, the concept medium is also used in arts to refer to older materials and techniques. Culture is in other words not seen within the subject merely as something "semiotically given and interpretable", but also as consisting of "techniques and rites, skills and practices" (Krämer & Bredekamp, 2013, p. 21).

Visual arts education is further interesting to study because of its emphasis on visualization. An established discussion within medium theory and related fields is how media become so embedded in everyday life that they sink into the background and become invisible (Bowker & Star, 2002; McLuhan, 1964; Parks & Starosielski, 2015; Peters, 2015b; Star & Ruhleder, 1996). This process is to some degree challenged by visual arts education that basically deals with vision; the ability to see and foreground rooms, environment and the familiar. This hands-on relation to media environments, that also includes critical and alternative approaches, opens up yet another possibility to work with media literacy within the subject. Perhaps it is not only the ability to interpret media images and communicate visually that art education can contribute to our contemporary media environment, but also the ability to think critically about the media infrastructures that shape our thinking?

Visual art educators are in turn central actors when it comes to developing the tradition of media literacy training in the subject, through handling and navigating different media technologies. In addition to a subject specific media ecology consisting of material, technologies and practices for image making from different time periods and traditions, art educators must also navigate the ongoing digitalization processes of education in general that involves hardware investments, policy development and the introduction of digital administration systems and e-learning material. The insistence on keeping older cultural techniques within the subject, and the open-ended learning processes that often characterize visual arts education, make an interesting contrast to the digitalization discourse, where "newness", usability and goal orientation is prioritized (Selwyn & Facer, 2013; Williamson, 2017). Such tensions between education and subject formation, tradition and change and semiotic and technical approaches, give visual arts education a unique position within the digitalized school, well suited to studying the relation between media and education.

The comparative perspective is used here to highlight how the relation between educators and technology differs depending on the sociocultural setting. While housed in similar educational systems, Sweden and Estonia represent rather different traditions of visual arts education that become visible when digital technology is introduced, within the subject as well as in education in general. To recognize these differences and how they have emerged, the study also assumes a historicizing perspective. Using the historical development of visual arts education and the organization of teacher training as a background, the study explores how different configurations of

the subject have emerged from certain material conditions entangled with imaginaries about the past and the future.

1.1 Situating the research

By taking infrastructuralism as the point of departure, this dissertation belongs to a growing body of work within media studies that presumes what Lisa Parks (2015a, p. 357) refers to as an "infrastructural disposition", concerned not only with what media represent or mean, but also what they are made of and the work behind their distribution and maintenance. One reason behind this turn towards materiality and distribution in media research might be the *logistical* qualities of digital media (Case, 2010; Peters, 2015b, p. 37; Rossiter, 2017). Unlike mass media, new digital media does not necessarily have a content but owes its power "precisely to its ability to colonize our desktops, indexes, calendars, maps, correspondence, attention, and habits" (Peters, 2013, p. 42). This power is in turn related to the increased mediatization of culture and society, where media is omnipresent and to some extent shapes and frames all aspects of social and professional life (Couldry & Hepp, 2017; Deuze, 2011).

An infastructuralist approach to media is, however, older than digital media, and can be defined as belonging to what Elihu Katz (1987, p. 33) calls the "technological paradigm" of media studies, originally associated with the Canadian tradition of medium theory and names such as Marshall McLuhan, Harold Innis and Joshua Meyrowitz. Contesting the definition of media as primarily carriers of meaning these theorists argued "that the form in which people communicate has an impact beyond the choice of specific messages" (Meyrowitz, 1986, p. 28). This means that the technology itself prioritizes certain ways of experiencing the world that often exceed what is actually being communicated. Moreover, medium theorists have emphasized the ubiquity of media by conceptualizing them as environments or ecologies, that *are* rather than being *about* the world (Meyrowitz, 1986, p. 17; Peters, 2015b, p. 21).

The relation between these media environments and broader processes of cultural and social development has been a major concern in medium theory, as well as in the latter wave of Germanophone media theory. Studies within these traditions are "typically undertaken as histories of the *long durée*, focusing on periods of epochal and mediatic stability and the caesura that punctuate them" (Friesen & Cressman, 2010, p. 5). Based on the idea that media technologies condition human thinking and experience, and that

the dominating technologies of a certain era becomes visible only after a new medium is introduced, this perspective is used to understand the relation between cultural change and technological development (e.g. Eisenstein, 1985; Kittler, 1990; McLuhan, 1967; Ong, 1982). In this dissertation, school digitalization is studied as a shift that not only makes possible new modes of knowledge production but that also renders established educational practices and technologies visible.

This emphasis on cultivation processes within the technological paradigm is also reflected in an interest in formal education. Medium theorists such as McLuhan, Postman and Meyrowitz have discussed how schools cannot be separated from the surrounding media society because of the way media structures knowledge production, arguing that television (as the dominating medium at the time) "like the alphabet or the printing press" "has by its power to control the time, attention and cognitive habits of our youth gained the power to control their education" (Postman, 1986, p. 145). From this perspective, it does not matter if television enters the classroom or not – "[t]he revolution has already taken place at home" (McLuhan, 1964, p. 230). This idea is expanded on by Meyrowitz, explaining how the access to information from different media sources weakens the position of schools as mediators of knowledge, regardless of if they are used in schoolwork or not:

> A particular classroom may not be electronically monitored and it may have no electronic receiving equipment. And yet the new information environments within which all the participants live outside the classroom may, nevertheless, undermine the traditional role structures and purposes of the school. (Meyrowitz, 1986, p. 174)

Thus, the major thrust of medium theory with respect to education, as Meyrowitz (1996) argues in a later text, "is not about the role of technology *in* the schools, but about the impact of technological change *on* the traditional schools" (p. 101). The dominance of television and its effect on learning made Postman (1979) argue for the importance of schools to function as counter cultures by promoting books as a medium, while Meyrowitz (1996) and McLuhan (1967, 1977) warned that such an approach could make schools irrelevant for children and young people, and that education instead should take the critical study of popular media seriously.

By emphasizing the role of media technologies in knowledge production and the fact that this must be addressed in education, Meyrowitz and

McLuhan can be seen as early advocators of what is now referred to as *media literacy* (Marchessault, 2008).[1] By the end of his career, McLuhan also co-authored a media education textbook for high school students called *City as classroom* (1977), combining the idea of schools as part of a bigger media ecology with critical perspectives on classroom technologies. Questions such as "Why is the blackboard at the front?" followed by a discussion about the "assumptions about teaching and learning which are evident in the set-up of your classroom" directs attention to the classroom as a media environment and education as a mediated practice (McLuhan et al., 1977, p. 43).[2] Other medium theoretical writings on formal education discuss the "soft infrastructures" of education such as school subjects and courses (e.g. McLuhan, 1964, p. 241; Postman, 1993, p. 142).

What medium theory brought to media education was, in other words, not *only* an interest in how media *outside* the classroom conditions compulsory education, but also a penchant for the mundane and the commonplace aspects of media. While the parallel media research strand of cultural studies over time has become more focused on popular culture, subcultures and informal learning processes, theorists within the technological paradigm have also focused on institutions such as schools and universities as media environments.[3] This perspective is to a large degree missing from contemporary research in the educational field, where "media are generally not seen in educational theory in such a way that they would constitute the 'water' in which teachers and students would figuratively 'swim'" but most times designate either "a cultural element outside of the institution" or "a technical element instrumentalized within educational contexts" (Friesen & Hug, 2009, p. 73). While contemporary media literacy scholarship tends to

—

[1] McLuhan also participated directly in the school debate by producing educational material. In 1959 he was commissioned by U.S. National Association of Educational Broadcasters to write a media education curriculum for high school students. The plan was never implemented but formed the basis of his ambitious book *Understanding Media* that was published in 1964 (Kuskis, 2015; Marchessault, 2008).

[2] This pedagogical framework has recently been rediscovered and discussed as a starting point to encourage students to "consider how the environment within which they interact, including the tools they use, helps to construct the world in particular ways that may influence their perceptions and actions irrespective of message content" (Mason, 2016, p. 94) and to expand the current definition of media literacy education (Dowd, 2018; Friesen & Hug, 2011).

[3] Early cultural studies research was, however, more interested in compulsory education. One example is Stuart Hall and Paddy Whannel (1964) who published a book on popular culture called *The Popular Arts*, originally aimed as a practical handbook for teachers with curriculum and classrooms plans, but in its edited form a more general guide to teaching popular culture (discussed by Richard Dyer in the introduction to the 2018 edition, p. xiii).

emphasize the learning taking place *outside* formal education and the need for local and community-based initiatives (e.g. Drotner, 1996, 2008; Erstad, 2013; Erstad & Sefton-Green, 2013; Mihailidis, 2014, 2019) educational technology and instructional media have become a concern mainly for applied teaching research (Friesen & Hug, 2009).

Situated within the technological paradigm of media studies, this study wishes to re-address schools as media environments by building on previous studies of learning institutions from medium theory. It further draws on the emphasis on work and local configuration in infrastructure studies by focusing on how educators enable these environments, made visible through a comparative perspective of two countries in the Baltic Sea region. The study also relates to the field of visual arts education where it wants to contribute with a media studies perspective on the relation between media technologies and subject traditions, as well as by offering a concrete framework for exploring and implementing a broader take on media literacy within the subject. From this stance, four areas of research with relevance for this study can be derived, namely: 1) studies on learning institutions as media environments, 2) studies of the teaching profession in these environments, 3) visual arts education as a media literacy subject, and 4) comparative media studies of the Baltic Sea region. These areas, how they overlap and how they frame this study, are discussed in the following sections with an emphasis on research from the Nordic context.[4]

1.1.1 Learning institutions as media environments

While most research on media in education is concerned with individual classroom technologies and their effect (of lack of such) on educational practice, the studies discussed in this section depart from a more holistic understanding of schools as "communicative figurations" (Breiter, 2014), "media ecologies" (Erixon, 2014) or "media systems" (Kittler, 2004; see also Friesen & Cressman, 2010). From this perspective, researchers from both media studies and educational studies have discussed the relation between spatial configurations, media technologies and the organization of education in schools (Breiter, 2014; Breiter & Ruhe, 2018; Kirkeby, 2006; Lawn & Grosvenor, 2005; Sørensen, 2009), as well as the intersection between schools and informal media environments of learning and subject formation (Erstad & Sefton-Green, 2013; Livingstone & Sefton-Green, 2016). Work in this field also concerns the imaginaries surrounding the intro-

[4] Including Estonia as part of the extended Nordic-Baltic region (e.g. Lagerspetz, 2003).

duction of educational media as opening up the classroom and facilitating common experiences and identities (Good, 2019, 2020; Lindgren, 1996), shaping the possibilities of and expectations on children's art making practices (Låby, 2018, p. 94) or even of the classroom as medium in its own right (Ericson, 2019).

Others discuss the more recent history of school computerization as a sociotechnical process. The introduction of information and communication technologies (ICT) in education is described by Estonian researchers as a top-down process (Runnel, Pruulmann-Vengerfeldt, & Reinsalu, 2009) and in Sweden as part of a broader rhetorical shift within education (Hylén, 2011; Karlsohn, 2009; Rahm, 2019; Riis, 2000; Söderlund, 2000) where the instrumental concept *digital competence* has replaced more critical or holistic values related to educational technology (Forsman, 2018; Godhe, 2019). In this context, the work of Lina Rahm and Michael Forsman has been valuable in understanding school digitalization as part of a broader *sociotechnical imaginary* (Jasanoff & Kim, 2015), where technology and the ability to handle digital tools is put forth as the solution to all problems associated with education. Rahm (2019, p. 63) also introduce the concept *educational imaginaries* that is used in this dissertation to discuss the visions of education underpinning school reforms and investments in technology.

Some of these contributions are related to what Neil Selwyn and Keri Facer (2013) refer to as *critical studies of educational technology*, a growing field of studies acknowledging the "linkages between educational technology use and 'macro' elements of the social structure of society such as global economics, labor markets, and political and cultural institutions" (p. 6). Research in this field has emphasized how the hype surrounding digital technology as a way to fundamentally change and personalize education is underpinned by commercial actors and interests (Player-Koro, Rensfeldt, & Selwyn, 2018; Selwyn, 2011b; Williamson, 2017) and how this hype, along with fears that technology will eventually replace teaching professionals, is part of a techno determinist narrative that can be challenged by looking at past and failed attempts to revolutionize education through technology (Chan, 2019; Cuban & Jandrić, 2015; Selwyn, 2011a, p. 59; Selwyn & Facer, 2013, p. 9; Sims, 2017).

The development and use of data driven technologies in education is further discussed by researchers as part of a "corporatized education reform" (Williamson, 2016) and educational imaginary where schools "are turned into data-production centres" (Williamson, 2017, p. 6). This trend "embraces school ranking and data-based decision making" (Breiter &

Ruhe, 2018, p. 335), opens up for new modes of governmentality (Hartong, 2016; Lupton & Williamson, 2017; Williamson, 2014) and risks reducing education to learning metrics and preparation for a future digital labour market (Forsman, 2019, p. 61-62; Selwyn, 2014a). These studies, that address the more overarching processes of school digitalization and its connection to politics and decision making, are used in this dissertation to motivate the relevance of the study and to provide a background against which visual arts education can be focused.

Another project on digitalization that has taken specific school subject cultures into account was conducted in the Swedish secondary school system by Per-Olof Erixon (2014) and his collaborators. Based on the media ecological tradition, the project explored how the subject conceptions of three different school subjects, among which visual arts education is represented, are being reshaped through the introduction of digital technologies. The case study on visual arts education shows how the communicative turn within visual arts education aligns with the introduction of digital media, but also reveals resistance within the art teacher community to replacing traditional techniques and approaches (Marner & Örtegren, 2013, 2014). A similar study from the Estonian context maps how the introduction of digital technologies is shaped by different subject cultures and teaching styles (Karaseva, Pruulmann-Vengerfeldt, & Siibak, 2013).[5] By focusing on the practice of teachers, these studies overlap with the next field of research of relevance for this dissertation, which explores the consequences of school digitalization for the teaching profession.

1.1.2 The teaching profession in the digitalized school

As Selwyn (2011b) has shown, most research on school digitalization concerns successful implementation of new technologies, featured as case studies of best practice, rather than describing the mundane and messy everyday encounters that teachers and students have with digital technology. Drawing on Walter Benjamin's distinction between *sailor stories*, about extraordinary things and events "set in far-away places and completely different from the experiences of the people listening" and *peasant stories*, "describing ordinary, mundane, close-by and apparently familiar events" Selwyn concludes that "ed-tech and ed-media are fields of study that are based upon the telling of 'sailors' stories' rather than 'peasants' stories' – and are ultimately all the poorer for it" (p. 212). In response to this im-

—

[5] Visual arts education is not included in this study.

balance, he suggests a turn towards teaching as a profession rather than towards the pedagogical process (see also Selwyn, 2011a, p. 127). Such a perspective allows for failure, ambiguity and negotiations to appear and is used in this dissertation to emphasize the human labour involved in making digital technology work.

Among these lesser told "peasant stories", are studies on teachers who refuse the introduction of new educational technologies, and their arguments to do so. Researchers have shown how this reluctance often reflects a lack of consensus and collaboration between different actors in the educational field, such as teachers, school management and municipalities, where the problems technology is expected to solve are not defined by teachers themselves but by developers or policy makers (Cuban, 1986; Grönlund, 2014; Håkansson Lindqvist, 2015; Salavati, 2016; Tallvid, 2015). Others point to the standardization and "pedagogical assumptions inherent in software" (Ferneding, 2003, pp. 97, 241) that do not always align with the pedagogical beliefs and needs of teachers (Bodén, 2016; Johannesen, Erstad, & Habib, 2012; Perselli, 2014). A related body of work explores how "the social shaping of technology" (Bijker, Hughes, & Pinch, 1987; MacKenzie & Wajcman, 1999) is played out in education, including how teachers use and develop technology in unanticipated ways (Jones & Bissell, 2011; Klebl, 2008; Lieshout, Egyedi, & Bijker, 2001). Research on how teachers resist and configure educational technologies is relevant for this study because it addresses the ambiguity of teachers in relation to these processes and asks how their alternative visions of the future can inform the policy development and implementation of educational technologies.

Apart from top-down technology implementation, the teaching profession is also reshaped by the introduction of social media for communicating with pupils, publishing student work and facilitating professional collaboration. This development has been discussed as blurring the boundaries between teachers and students (Ekberg, 2012) as well as between paid work and leisure (Rensfeldt, Hillman, & Selwyn, 2018; Thunman & Persson, 2017). The documentation and online sharing of material can also be understood in the light of new demands on transparency and accountability in educational practice, where teachers represent their work in accordance with expectations as part of legitimizing their profession (Annerberg, 2016, p. 301; Ball, 2006; Biesta, 2010; Mickwitz, 2015, p. 75). Although mainly focused on writing practices, these works are relevant to the study at hand in order to understand teachers' representations of their work as part of a

neoliberal turn in educational politics, but also to conceptualize the difference between these representations and actual pedagogical practice.

But teachers can also use digital media to make visible aspects of their work that they find important. A recent study on the communicative practices of Swedish pre-school teachers discusses how these educators understand digital media communication as an opportunity "to show the preschool to the world around them, especially to presumptive parents" and to thereby "establish a counter to the image of preschools as 'day care centres', which they perceive as dominating the news media" (Eckeskog, 2019, pp. 240–241). As a profession dominated by women, based on embodied or tacit knowledge and with fairly low status (also compared to other teacher groups), pre-school teachers have a lot in common with art teachers, and Eckeskog's study has been helpful in understanding the specific conditions that apply for low status professions in their struggle for legitimacy.

Specific studies on the profession of the art teacher in relation to school digitalization in a Nordic context include Catrine Björck's (2014) dissertation, where she shows how the introduction of computers in the subject might lead to an emphasis on technical supervision in the art teaching profession, and Frida Marklund's (2019) study, where she discusses the emphasis on traditional technologies as a resistance from the art teacher community against an increased focus on measurability and predefined learning. In an earlier dissertation Eva Skåreus (2007) explored how student art teachers imagine their future profession through analysing how they represent themselves as teachers in digital images. Although not explicitly addressing school digitalization, the results from this study are important for this dissertation because they show that the "depicted teachers assume a mediating position" (p. 224) interacting with different material and cultural expressions, and through assuming a media theory approach to the participant created material. All three studies (Björck, 2014, p. 49; Marklund, 2019, p. 15-16; Skåreus, 2007, p. 88) discuss how the introduction of digital technology in visual arts education has opened up for the use and study of popular images and genres, through techniques such as digital collages and postproduction. In this way, these studies overlap with a third area of research, namely that of visual arts education as a subject concerned with *media literacy,* defined as the ability to access, analyse, evaluate and create own media content (Aufderheide, 1993).

1.1.3 Visual arts education as a media literacy subject

The historical development of visual arts education have been thoroughly studied, at least in the case of Sweden where it is typically conceptualized as three or four more or less distinct traditions: a technical subject in the 1800s, an aesthetical subject in the early 1900s, and as a communication subject in the late 1900s (Åsén, 2006, 2017; Eklund, 2002; Kockum et al., 2019; Nordström, 1994; Pettersson & Åsén, 1989; Wetterholm, 2001), sometimes supplemented with a fourth turn towards visual culture emerging in the 1990s (Hellman, 2017; Lind, 2010). A similar move from skills training to concept based art can be identified in higher art education in Sweden, where figure study was abandoned as a compulsory and central practice in the mid-1900s and replaced by a more theoretical and individualised study route (Edling, 2010, pp. 255–259). In Estonia, art education researchers have identified a shift from an atelier tradition during the Soviet era, based on reproduction and a fixed art canon, to a subject more oriented towards contemporary art practices (Kärner, 2006; Vahter, 2015, 2016).[6]

The subject conception of art education as a communicative, visual culture oriented subject aligns with the call for media production and participation in the media literacy field, and visual arts education research has been keen to highlight the introduction of new media forms in the subject as a way of making children and young people more "media literate" by developing a critical and reflective attitude towards contemporary media culture (Buhl, 2005; Chung & Kirby, 2009; Danielsson, 2002; Duncum, 2001; Freedman & Stuhr, 2004; Kárpáti & Gaul, 2013; Tavin, 2003) as well as to offer modes of expression and participation (Hellman, 2017; Hickey-Moody, 2013; Öhman-Gullberg, 2008). The self-cultivating and democratic potential ascribed to media production positions visual arts education within the mainstream of media literacy, where media education is understood as "enhancing the capacity of people to enjoy their fundamental human rights" (Wilson, Grizzle, Tuazon, Akyempong, & Cheung, 2013, p. 20).

In contrast to the first wave of media education, that had a strong protectionist character and focused on media effects and their negative impact on children and young people, contemporary media literacy scholarship is more focused on empowerment and participation (Buckingham, 2003, pp.

—

[6] These nation specific traditions are discussed in further detail in chapter four. In this dissertation they function both as previous research used for contextualizing the study and *as an infrastructure in itself* – embedded in media, architecture, written accounts, discourses and educational material, and used to understand and motivate the present beliefs and ideas concerning visual arts education.

6–7; Hobbs, 1998; Mihailidis, 2014, pp. 36–37). Although recognizing the potential dangers of exposing children to media representations of violence, gender stereotypes and commercialism, it emphasizes the ability of audiences to produce their own, critical readings or media productions as forms of protection. In short, media literacy education today "is seen to empower people to be both critical thinkers and creative producers of an increasingly wide range of messages, using images, sound and language" (Feilitzen & Carlsson, 2004, p. 8).

In a dissertation about visual arts education, the notion that media literacy should educate "both critical thinkers and creative producers" is of particular interest. This approach emphasizes the creation of own media content as a way to help "analyze that produced professionally by others" (Livingstone, 2012, p. 3), but also to encourage participation by producing alternative stories to those offered by mainstream media (Kellner & Share, 2007, p. 61) and making use of the possibilities for media production and distribution that have emerged with accessible tools and online publishing opportunities (Buckingham, 2003, pp. 124–125; Christensen & Tufte, 2010). Indeed, the turn towards visual culture in art education can be seen as a part of a cultural studies response to earlier, protectionist approaches to media in education, expressed within the subject as a belief that "the curse of mass production and the anti-aesthetic of poorly made utilitarian objects could be transcended through the study of beautiful objects and the cultivation of taste" (Tavin, 2005a, p. 106).

The choice of the term *literacy* to express this orientation is, however, disputed because of its "textualist bias" that points to an understanding of knowledge and culture as language-based rather than grounded in practice or materiality (Fritze, Haugsbakk, & Nordkvelle, 2016; Krämer & Bredekamp, 2013). The literacy concept is further connected to third world development and foreign aid initiatives.[7] These assumptions of culture as text and its consequences for epistemology and international politics have led to a range of alternative suggestions on how to conceptualize the knowledge and skills involved in handling visual media, including "visual Bildung" (Fritze et al., 2016), "material intelligence" (diSessa, 2000) or "picturacy" (Hug, 2011). Others have suggested a material turn in media literacy education, towards the study of data processing systems, infrastructures,

—

[7] From the 1950s UNESCO have supported the international drive to "eradicate illiteracy" as a way to towards human rights and individual development in the third world. Later initiatives have further emphasized literacy as a condition for economic growth and national development (UNESCO & Education for All, 2005, p. 153).

and environments, also including the environmental impact of digital technologies (Gray, Gerlitz, & Bounegru, 2018; Hartong & Förschler, 2019; López, 2015; Meyrowitz, 1998; Pötzsch, 2016; Redmond, 2019; Säljö, 2012).

A similar conceptual debate has taken place within visual arts education, in a recent issue of *International Journal of Education Through Art* where Marie Fulková (2019) states, that while literacy *can* be used as a generic term for knowledge in a specific area, it also aligns with a cognitivist line of thinking where "the image (and culture) can be encoded, decoded, constructed and thus deconstructed, analysed or, in other words, read as a text" (p. 76). In the same issue, Luis Errázuriz (2019) argues that "the idea of 'visual literacy' suggest a passive and submissive connotation on part of the 'illiterate'" while the term *competence* is associated with economic and instrumentalist values, and instead promotes the term *visual education* (pp. 15, 22). In a final remark, representatives for the European Network for Visual Literacy (ENViL) agrees that literacy has an "elitist flavour" and that it "can refer to a semiotic approach in philosophy, as a specific approach to the way we arrive at knowledge about the world" (while disregarding the demur about the term competence) and announces that ENViL will hereafter use the term *visual competence* (Schönau & Kárpáti, 2019, p. 97).

Another interesting concept in relation to literacy is that of *cultural techniques*, roughly defined as the mutual shaping of practical or cognitive skills, material artefacts and thinking (Krämer & Bredekamp, 2013, p. 25; Winthrop-Young, 2013, 2014). Literacy, as one of the central cultural techniques, indeed has many similarities with this conceptualization but also some crucial differences. As Barbara Gentikow (2007) points out in her comparison between the two traditions, cultural techniques lack the optimism associated with the literacy concept through its connection to human rights and third world development, and perhaps even more important, brings larger societal processes to the fore. Techniques such as reading, calculating or map-making are far more than skills, they also transform thinking, knowledge and culture. From this perspective, cultural techniques can be described as a kind of "'macro-version' of the literacy research tradition" that "tries to understand the impacts of media technologies on the human mind and socio-cultural development in a very broad sense" (Gentikow, 2007, p. 85).

For visual arts education in general, and for this study in particular, cultural techniques as a theoretical perspective provide a useful supplement to the literacy metaphor, since they emphasize culture as practice and skills but also because they recognize the material embedment of knowledge, in

educational and scientific infrastructures such as classrooms, artist studios and labs (Krämer & Bredekamp, 2013, p. 27; Latour, 1987). As such, it also constitutes a bridge to the body of work on schools as media environments, discussed above. Taken together, the fields presented here point to a need for critical and empirically grounded research on teachers' experience of technology, as well as on historical perspectives on the relation between media and education. They further show an ambiguity from the research and educationalist communities towards the term media literacy, and the need to develop more inclusive approaches to work with media in the classroom and elsewhere.

1.1.4 Comparative media studies on the Baltic Sea region

In addition to the research fields discussed above, this study is also situated within a tradition of research on the Baltic Sea region, prominent at Södertörn University and not least in media and communication studies. Researchers within this department have worked in close collaboration with universities in the Baltic region and a lot of research has been conducted on Estonia and its transformation from Soviet state to an e-economy (e.g. Ericson, 2002; Kaun, 2012; Opermann, 2014). Other studies from this research environment have compared Estonia and Sweden in order to understand how media practices emerge from different historical contexts, where Sweden as a fairly stable democracy and consumer society makes an interesting point of comparison to the transformation processes taking place in Estonia (e.g. Bengtsson & Lundgren, 2005; Bolin, 2016).

As in the present study, these researchers use the past to understand the present and compare nations "as a strategy for 'seeing better', rather than in order to draw more general comparative conclusions" (Livingstone, 2003, p. 484). This approach does not assume that nations are comparable units that can be studied through standardized methods and concepts but starts from the idea that each context is fundamentally different and "compares things in order to understand *in which ways* things are different" (Bolin, 2016, p. 16). It is, in other words, not the nations as such that are in focus, neither their school systems or other seemingly comparable units, but how different processes are played out within and across these contexts.

This also includes recognizing that categories and concepts might mean different things in different cultural contexts. As Stina Bengtsson and Lars Lundgren (2005, p. 22) show in their study about youth culture, *youth* means something else in Estonia to what it does in Sweden, due to the historical differences between these nations. The same, of course, goes for

schools and education and during the course of the study it has become clear that visual arts education means one thing in Estonia and another thing in Sweden. Indeed, as Sonia Livingstone (2003, p. 283) points out, all research is comparative in the sense that it uses conceptual categories that assert distinctions, at the same time as these categories are culturally specific. In this way, cross-national comparisons can be a way to become aware of and make visible one's own preconceptions and reasoning (Bengtsson & Lundgren, 2005, p. 22; Blumler, McLeod, & Rosengren, 1992, p. 8; Jasanoff, 2015a, p. 24; Livingstone, 2003, p. 478).

The comparative perspective is also valuable in order to see how large scale infrastructures are developed and configured differently in different socio-political contexts (Bowker & Star, 1999, pp. 290–293; Edwards, 2003, p. 199; Jasanoff, 2015b, p. 333). In this case, the comparison between Sweden and Estonia allows for the study of national configurations to global systems, such as how international calls for media and information literacy or global processes of digitalization are played out in a certain, historically situated, educational culture (c.f. Breiter, 2014). This cultural context is not limited to nation states as such, but also includes communities within these nations such as the Russian speaking minorities in Estonia, or specific universities representing different traditions of visual arts education.[8]

To understand how the differences between visual arts education in Sweden and Estonia have emerged and how this matters for the way the subject is understood and practiced today, this study also contains elements of temporal comparison. It starts from an understanding of the *past as indeterminate*, meaning that memories and knowledge of the past are revised and narrated to fit present beliefs and future desires, but also that memories can differ across a given institutional space, such as a school or a university (Bowker & Star, 1999, pp. 40–42). From this point of departure, infrastructuralism as a theoretical orientation addresses not only the lack of mundanity in post-structuralism, but also the ahistorical tendencies in the structuralist tradition (Peters, 2015b, pp. 33–36). This historicizing perspective is discussed more in detail in the methods chapter, while the following section gives a brief introduction to the national cases.

—

[8] Taking the nation state as the only point of departure would be what Nick Couldry and Andreas Hepp (2009) refer to as "territorial container thinking", the tendency in comparative media studies to confuse nation states with societies, thus ignoring all the differences and groupings within a certain state. Instead Couldy and Hepp suggest a model of transcultural comparison, where global media capitalism is the overarching frame and nation states just one possible reference point, along with communities and less place bound or deterritorialized entities such as online spaces or popular culture.

1.2 Why Sweden and Estonia?

The choice of which countries to include in a cross-national comparative study will shape not only the results, but also what questions can be asked. Comparisons between similar nations/cultures will capture more subtle differences, while studying dissimilar nations will show bigger patterns (Livingstone, 2003, pp. 486–487; Livingstone, d'Haenens, & Hasebrink, 2001, p. 12). In an attempt to capture both subtle and more distinct differences, the study compares two national cases that are similar but not *too* similar, namely Sweden and Estonia.

To begin with, the organization of compulsory education in these countries is more or less the same, consisting of a basic school from K-9, followed by three years in high school or vocational training (European Commission, EACEA, & Eurydice, 2018). These similarities between school systems can be partly explained by a long history of cultural exchange and the fact that in the 16th century, during the formation of the first public schools[9] and grammar schools, Estonia was a part of the Swedish kingdom (Piirimäe, 1997). After the second world war, when Estonia became part of the Soviet Union, the differences in social, political and cultural life between the Baltic states and the Nordic region grew bigger (Lagerspetz, 2003; Lauristin, 1997).[10] This applies also to visual arts education, a compulsory school subject introduced as technical drawing in both Sweden and Estonia, though the two have developed in different directions.

The Estonian and Swedish school systems have further been subject to a range of initiatives promoting digitalization, both through hardware investments and policy development, and according to a report on ICT in education carried out for the European Commission (2019b, 2019a), schools in both countries have a provision of digital equipment (e.g. laptops, computers, cameras, smartboards) per student and internet connection well above the European average. In Estonia, investments in e-infrastructure are strongly encouraged by the Estonian government, currently branding the nation as e-Estonia, or "the most advanced digital society in the world" (Enterprise Estonia & Estonian Investment Agency, 2017). To facilitate this

—

[9] The term "public school" is used throughout the dissertation to refer to publicly funded schools, and not to the UK system of exclusive private schools.

[10] After achieving independence from the Soviet Union in 1991, Estonia today make up a rather young democracy whereas Sweden can be defined as a post-welfare state who have been at peace for the last 200 years. They also differ in size and population. Estonia is a small nation with only about 1,3 million citizens and a large Russian speaking population whereas Sweden have almost 10 million citizens (SCB, 2020; Statistics Estonia, 2020).

transformation, major investments have been made in basic education, such as the *Tiger Leap Project,*[11] launched in 1997 to improve access to computers and internet in schools, and offering ICT courses for teachers (Karaseva et al., 2013, p. 15; Opermann, 2014, p. 27). Later investments have been directed more toward policy, teacher training and the development of e-resources (Ministry of Economy and Communication, 2014, p. 49). Similar efforts have been undertaken in Sweden during the last thirty years, from state funded infrastructure developments to current municipal "one laptop per child" initiatives (Hylén, 2011, pp. 27–32; Tallvid, 2015). Such fundamental changes in how education is organized are also encouraged on a national policy level and in 2017 the Swedish National Agency for Education revised the national curriculum to promote *digital competence* in all school subjects (Skolverket, 2017).

Despite these investments in digital technology for education "issues of media literacy and media education have remained in a marginal position in school curricula and school activities", as put by Ola Erstad (2010, p. 16) in his overview of the Nordic region. The curricular implementation of media related knowledge often focuses more on user skills and work-preparation than on critical perspectives and explorative pedagogies (Erstad, 2010, p. 21; Godhe, 2019). In Sweden, this is manifested through the choice of the term digital competence in the national curriculum rather than the related concept of media literacy, where "media literacy stems from a long term tradition of pedagogical and academic work" while "digital competence comes from the policy circuits of the OECD and the EU" and is part of a neoliberal framework that prioritizes instrumentalism and employability (Forsman, 2018, p. 25). In the Estonian national curriculum, media education is implemented in a similar way, defined and assessed through predefined learning outcomes and with an emphasis on skills in front of critical and civic perspectives (Ugur & Harro-Loit, 2010).

But Erstad (2010, p. 20) also points to the Nordic region as having an established practice of media education based on production and aesthetic expressions, integrated in "marginal" school subjects such as arts (Erstad & Sefton-Green, 2013, p. 94). As discussed above, Sweden is part of this tradition with a strong emphasis on visual communication in visual arts education, whereas in Estonia media education is mainly situated within other subjects or as cross-curricular projects. Estonian educators have also identified the tradition of teacher-centred education as a challenge when it comes to

—

[11] *Tiigrihüpe* in Estonian.

including the media experiences of children and young people in compulsory education (Ugur & Harro-Loit, 2010, p. 141). Despite being part of the same international policy framework, "local professional cultures and professsional backgrounds seem more determining of how educational practice is formed than policy and curriculum" (Amdam, 2017, pp. 93–94). For this dissertation, this means that art educators in Estonia and Sweden will relate in very different ways to the introduction of digital tools and systems into their everyday work, depending on local pedagogical traditions and subject conceptions. These differences will be used as a point of departure to explore how media are locally configured and negotiated, as well as how the introduction of digital media shapes established educational practices.

1.3 Aim and research questions

The main aim of this dissertation is to understand *how media used within visual arts education in Sweden and Estonia are connected to different traditions and ideas about education, and how art educators understand and navigate this relation*. Based on these results, a secondary aim is to discuss *how media education can be developed and implemented in compulsory education to respond to the challenges and possibilities of contemporary media culture*.

In line with the emphasis on site-specificity in infrastructure studies (Parks, 2015a; Parks & Starosielski, 2015, p. 11), the dissertation is based on specific locations where visual arts education is defined and practiced, such as university institutions, online discussion groups, visual arts education conferences, extracurricular art schools and art classrooms in compulsory schools. In order to understand how educators understand and configure these media environments, the relation between educators and these spaces are explored through a combination of methods including in-depth interviews, written and visual field notes as well as more experimental approaches such as video walks and participatory drawing workshops. The latter, more interventionist, approaches have been added to the methodological package in order to achieve what Geoffrey Bowker and Susan Leigh Star (1999) refer to as an *infrastructural inversion,* a shift in attention to the "technologies and arrangements that, by design and by habit, tend to fade into the woodwork" (p. 34), in this case to foreground the invisible and taken-for-granted material, practices and discursive elements that underpin visual arts education and the art teaching profession.

The spaces examined here are understood as *enabling environments,* making possible certain practices and modes of thinking and at the same

time "recursively constructed by the life forms they enable" (Peters, 2015a, p. 47). The spatial configurations, media technologies, standards and techniques that make up the sites of visual arts education are conceptualized in the research questions as *media*, while the term *enable* refers to the logistical and structuring qualities of these environments (RQ1) as well as the hands-on work and conscious negotiations performed by educators (RQ2). The main aim is operationalized by the following research questions:

1. How do media enable visual arts education in Sweden and Estonia?
2. How do art educators in Sweden and Estonia understand and enable media?

To answer the first research question, the study uses a historicizing perspective to map the connections between certain cultural techniques and visions about what visual arts education should be about or do. It further explores the materializations of the subject such as curricula, classrooms, tools and teaching material and how they contribute to shaping pedagogical practice. Research question two explores how art educators understand this relation and how they negotiate it through the configuration and development of infrastructures. Sub-questions here include: How do art educators understand the enabling qualities of media? How do they perceive and negotiate past traditions within the subject? How do they relate to digitalization processes and demands on increased visibility and accountability? How do they imagine the future of visual arts education and how it can be enabled through media?

The results from these two research questions are then used to inform a discussion related to the secondary aim of the dissertation, namely to explore in what ways the connections found between visual arts education and media environments can be used to broaden current definitions of media literacy and to develop pedagogical approaches that can be used in compulsory education. This secondary aim is discussed in two steps, in relation to the theoretical framework in the concluding discussion and more concretely in a tentative curriculum for visual arts education, presented in a postscript to the dissertation.

By directing attention to schools as media environments and teachers as media workers, the study wants to contribute with 1) *empirical material* on how large, standardized systems are configured locally with regards to both nation-specific conditions and different school subjects, 2) *methodological*

approaches to study these situated, yet partly hidden, media environments, 3) a *theoretical understanding* of the mutual shaping of media technologies, spatial configurations and knowledge production as it is played out within visual arts education in the compulsory school system, and 4) *didactic approaches* on how to address these issues through media education, thereby expanding the field of media literacy.

1.4 Structure of the dissertation

In the above introduction (1), the topic and the aim of the study is presented and situated in relation to previous research, including studies of schools as media environments, research on the teaching profession in the digitalized school, literature on visual arts education as a media literacy subject and comparative media research on the Baltic Sea region.

The next chapter (2) introduces the theoretical and conceptual framework through which the empirical material is approached and analysed. Drawing on Peters (2015b, p. 33) suggested doctrine of *infrastructuralism*, it situates the dissertation within a technological paradigm of media studies, approaching media as environments that structure thinking and acting. This rich theoretical tradition is reviewed in two subchapters, the first one concentrated on medium theory, media philosophy and Germanophone media studies and the second more focused on the concept of infrastructures.

The infrastructural perspective is developed further in the methods chapter (3) where the attempt to foreground the invisible standards and practices that enable media is defined as an *infrastructural inversion* (Bowker & Star, 1999, p. 34). To achieve this shift, the dissertation used a mixed methodological approach consisting of ethnographically inspired fieldwork, expert interviews, participatory drawing workshops and video walks. These methods are described in separate sections, followed by a discussion of the analytical approaches and some reflections on practical challenges and ethical considerations emerging during the research process.

Chapter 4 consists of a historical overview of the educational system and processes of school digitalization, the development of visual arts education and the training of art educators in each national case. It is based on previous research and constitutes a bridge between established narratives of educational development in each national setting and the more empirical chapters (5, 6, 7). These are structured temporally and to some extent also correspond with the conceptual framework:

Chapter 5 addresses the *past* of visual arts education and discusses the historical development of the school subject and of art teacher training in Sweden and Estonia from the theoretical perspective of *cultural techniques* (e.g. Siegert, 2015; Winthrop-Young, 2013), showing how the emphasis on different techniques and genres is historically linked to certain conceptions of what visual arts education should be about. The chapter further discusses how the past is manifested in school architecture, teaching material and media technologies and how art educators negotiate subject traditions through interacting with and thematizing older cultural techniques.

Chapter 6 explores *present* processes of school digitalization and the position of visual arts education within this context by identifying a *sensibility to infrastructures* as a part of the art teaching profession, and by discussing how art educators act on this sensibility to manage their work in environments and systems mainly designed for another kind of practice. The chapter further describes how visual arts education operates in the intersection between invisibility and visualisation.

Chapter 7 assumes a *future* perspective on the subject and draws on the theoretical concept *sociotechnical imaginaries* (Jasanoff & Kim, 2015) to discuss how digital technology is integrated in the spatial and discursive configuration of schools, and how the *infrastructural imagination* (S. J. Jackson, Edwards, Bowker, & Knobel, 2007) of art educators can be facilitated to bring forth alternative visions to the dominating sociotechnical imaginary on school digitalization.

Chapter 8 is a concluding discussion of the findings from the present study, and an account of how it contributes to media studies and media education. The first part of the chapter summarizes the empirical findings from chapter five, six and seven while the second part draws on these findings to discuss and develop media literacy education. This pedagogical framework is conceptualized as *infrastructure literacy* (Parks, 2010) and further concretized through a tentative curriculum that is placed as a postscript after the concluding chapter, directed towards teachers and teacher educators who want to implement infrastructure literacy in visual arts education.

1.5 Summary

- By comparing two distinct national settings from a historicizing perspective, this dissertation aims to understand how visual arts education is shaped in relation to past, present and imagined future

media environments in schools and how educators understand and negotiate this relation.

- The double perspective on media as, on the one hand, making possible certain subject conceptions and, on the other hand, being dependent on the work of educators is conceptualized in the title as *enabling media*.
- By discussing visual arts education from a media studies perspective, the study connects to an established interest within medium theory of schools as media environments conditioning educational practices and imaginaries.
- This perspective differs from an educational science perceptive by assuming a historizing perspective on media related change and by taking an interest in how educators relate to these processes, rather than in the learning processes of children.
- It also supplements the dominating approach to media literacy education by focusing on media as environments and infrastructures rather than on media content, popular culture and semiotic interpretation.

CHAPTER 2

Infrastructuralism as a theoretical and conceptual framework

The introductory chapter situated this study within a technological paradigm of media studies, approaching media as modes of organizing and thinking rather than as content or messages. This chapter aims to develop on this theoretical perspective and to introduce the conceptual framework used in the analytical chapters. As Peters (2015b) has pointed out, "the idea that media theory is about environments and infrastructures as much as about messages and content is well rooted in a variety of intellectual traditions" (p. 4), including media philosophy, medium theory, Germanophone media theory, science and technology studies (STS) and infrastructure studies. Taken together, they might represent what he refers to as *infrastructuralism* (Peters, 2015b, p. 33), the theoretical orientation that has informed the problem framing and research design in this dissertation. However, they also constitute separate, sometimes overlapping or contradicting traditions with distinct terminology and empirical focus. This study draws on some of these to ask questions about how media structures visual arts education, and what is possible to do and imagine within the subject.

In medium theory, media philosophy and the strand of research within German media theory concerned with cultural techniques, most scholars use archival and theoretical approaches to study the structuring or civilizing qualities of media. These research strands share a historicizing perspective on the relation between technological and cultural development and a broad definition of media and are used in this dissertation to make sense of the embodied techniques involved in shaping visual arts education. What STS and infrastructure studies add to this theoretical framework is a strong emphasis on relationality and work, which informed the decision to use a more ethnographically inspired approach. Theories of infrastructure have also been useful in understanding school digitalization as a sociotechnical process, where the educators in focus of this study make up one of the

actors. The term infrastructure is used in this dissertation not only to refer to "stuff you can kick", as suggested by Parks (2015a), but as a relational concept that includes also "soft infrastructures" like standards, memories and routines (Bowker, Baker, Millerand, & Ribes, 2009, p. 97). However, I agree with Parks on the gains on using the term over related concepts like network because of its emphasis on distribution over consumption and production, as well as its insistence on situatedness.

The chapter is structured in two parts, beginning with a discussion on the relation between media technologies, culture and education, introducing the concept *cultural techniques* and how this is used in this dissertation. The second part develops the *infrastructural perspective* and defines a set of sub concepts to discuss different aspects of invisible work and infrastructure development. It further introduces the concept *sociotechnical imaginaries*, used in this study to describe the visions that underpin the media infrastructures of education, and to discuss the possible tensions that might arise between these visions and how visual arts education is perceived and discussed by educators in the field.

2.1 Media as enabling environments

As discussed in the introduction, the ubiquity of digital technologies and the media saturation of contemporary culture and society invites an understanding of media as environments. Not only do people spend more and more time using media technologies or base their understanding of the world on mediated representations, they also experience time and space differently based on new media for tracking and orientation. As Mark Deuze (2011) has argued, "we live *in* media, rather than *with* media" (p. 143). For Peters (2015b, p. 19), the structuring and ambient qualities of digital media gives them more in common with "old" or even "ancient" media such as calendars, clocks, lighthouses or stamps than with 20th century mass media, which in turns point to a *broadening of the concept of media.*

This "ontologizing and pluralizing of media" (Peters, 2015b, p. 15) can be originated to the tradition of medium theory, where theorists such as McLuhan (1964), Innis (1951) and others not only emphasized the relation between media and cultural development, but also insisted on a definition of media that exceeds mass media technologies and includes other means of extending human possibilities such as electric light, buildings, money or clothing. From this perspective, the idea that we live *in* media does not simply apply to the contemporary mediatized society but is rather some-

thing that constitutes the human condition. Environments in this context becomes more than a metaphor, it also encompasses what we call nature and the ways in which it is made inhabitable by humans, as described by Peters:

> To sustain the complex web of artificial life forms in which humans as we know them live, such elements need to be managed technically. Water is stored and channeled, fire domesticated into flame, the earth burnt into fields and shaped into cities, and the sky observed for signs of the times. Our bodies too are natural organisms that depend on a vast array of cultural techniques, most of them ignored by traditional communication theory as subpar vehicles of meaning-making. To build a world in which seven billion people could live, many basic infrastructures and forms of training had to take hold. Fire control, housing, clothing, speech, agriculture, herding, settlement, writing, utilities, and technologies of all kinds serve as life supports for almost all humans today. Each of these intelligent contrivances spans matter and mind, nature and art, biology and culture. Building on the pervasive use of the term 'media' in the life sciences for containers in which organisms can grow, I regard media as *enabling environments.* (Peters, 2015a, p. 46)

What can be derived from this conceptualization of media is an emphasis on skills and the handling of tools and technologies, and also on the cultivating qualities of these techniques. This subchapter elaborates on this practice aspect of media environments, starting with 1) an exposition of the concept of cultural techniques related to a discussion on the extended definition of media, followed by 2) a discussion on how education is shaped by different technologies, and also how it can make up a technology in itself. The latter section is mainly based on the writings of Friedrich Kittler and includes a short discussion on technical determinism.

2.1.1 Cultural techniques: an ontologizing and pluralizing of media

As mentioned above, the technological paradigm in both Canadian and German media studies is associated with "an expansive, almost inflationary, use of the all-purpose moniker *media*" (Winthrop-Young, 2014, p. 382). This wider definition of media, that also includes old media and embodied techniques such as language, can be understood as a way to stress the ontological qualities of media technologies and to challenge "the sense prevailing in the twentieth century that media were human made channels that carried news, entertainment, advertising and other so-called content" (Peters,

2015b, p. 48). In the German tradition, the term media expanded into the concept *cultural techniques*. Unlike medium theory and media philosophy, this body of research is not sprung from media and communication studies but from literature studies and humanities more broadly. The concept of cultural techniques was introduced in this context as a way to change the reference frame for humanities research and to shift attention from textual interpretation to technologies, as described by Bernhard Siegert in his introduction to the field:

> To repeat, the objects of research that defined communication studies (press, film, television, radio – that is, primarily mass media) were never of great interest. Literature and media analysis replaced the emphasis on authors or styles with a sustained attention to inconspicuous technologies of knowledge (e.g., index cards, writing tools and typewriters), discourse operators (e.g., quotation marks), pedagogical media (e.g., blackboards), unclassifiable media such as phonographs or stamps, instruments like the piano, and disciplining techniques (e.g., language acquisition and alphabetization). These media, symbolic operators, and drill practices, all of which are located at the base of intellectual and cultural shifts, make up for the most part what we now refer to as cultural techniques. (Siegert, 2013, p. 49).

This wide and somewhat vague definition of cultural techniques indeed invites a repetition of the question posed by Geoffrey Winthrop-Young (2014, p. 384): "What is *not* a cultural technique?". One tentative answer would be that suggested by Johan Fornäs (2017) that if "cultural techniques are defined as something more specific than techniques in general" they must in some way be related to *culture* (p. 154). But what definition of culture?[12]

The term culture originates from the Latin term *cultura* meaning to inhabit, protect or grow, that later gave rise to the agricultural term *cultivation* and a definition of culture as something created by humans and separated from nature (Fornäs, 2017, p. 12; Williams, 1976, p. 77). This *ontological* definition of the term was later supplemented with an *anthropological* definition where culture, in Williams' terms, is understood as a "whole way of life", an *aesthetic* and institutional definition of culture as art, and a *hermeneutic* definition of culture as meaning making (Fornäs, 2017). Visual arts education connects to at least two of these definitions. To begin

—

[12] A mapping of the usages of the term since its introduction in the German speaking world in the late 19th century (varying from "rural engineering" to what in English could be described as media literacy) suggest that the conceptual confusion associated with the concept culture to a large extent applies also to that of cultural techniques. (Winthrop-Young, 2013, p. 4).

with, it is a school subject concerned with making art and developing knowledge about culture in the institutionalized sense of the term. It is also, like all education, a civilizing practice where certain skills and competences are cultivated to "bring forth a certain kind of subject and a certain kind of society" (Geoghegan, 2013, p. 77).

This two-fold affiliation applies also to the term *cultural techniques* that has been used to signify both techniques associated with symbolic production exclusively and as techniques involved in introducing and upholding the distinctions upon which civilization rests, such as that between nature and culture or between inside and outside. The latter, broad definition of cultural techniques is promoted by Siegert (2013, 2015) while Thomas Macho (2013) have suggested a limitation of the term to refer strictly to techniques that have the "ability to thematize themselves" and "that make symbolic work possible" (p. 30). Such "second order techniques" include singing, reading and painting and point towards a definition of culture as art and meaning making, rather than as a "production of ontological distinctions" (Siegert, 2013, p. 57).

Contemporary research on cultural techniques, both that drawing on an ontological/ anthropological definition of culture and in the narrower aesthetical/hermetic sense, can be described as a "shared interest in describing and analysing how signs, instruments, and human practices consolidate into durable symbolic systems capable of articulating distinctions within and between cultures" (Geoghegan, 2013, p. 67). Common to both these definitions is also the notion that cultural techniques refer mainly to the operations that *precede* specific concepts and media technologies. In an often cited definition Macho (2003, quoted in Winthrop-Young, 2013) states that "[c]ultural techniques – such as writing, reading, painting, counting, making music – are always older than the concepts that are generated from them" (p. 8). This definition is developed in a later text, explaining:

> Cultural techniques cannot be practiced without media, but they cannot simply be reduced to media technologies either. Even if it is unclear which cultural technique should be considered the first, it is safe to argue that cultural techniques are always already older than their media and that they are certainly older than the terms which emerged from them. (Macho, 2013, p. 44)

In a reciprocal process, the media technologies and concepts generated by practices, skills, and procedures in turn helps to reshape these practices (Geoghegan, 2013, p. 69; Siegert, 2015, p. 11). Drawing as a cultural tech-

nique is older than pencils, papers and slates, older than the central perspective and older than formalized art education, at the same time as these material, cognitive and institutional technologies have reshaped drawing as a practice. In visual arts education, drawing has also been utilized *as a technology* in the more Foucauldian sense as a procedure employed to maintain and reproduce social order (c.f. Behrent, 2013; Hermes, 2012).

Although translated into English as *techniques*, the original German term *technik* (as in *Kulturtechniken*) covers both these aspects of technology as on the one hand "drills, routines, skills, habituations or *techniques*" and on the other "tools, gadgets, artefacts or *technologies"* (Winthrop-Young, 2013, p. 17).[13] Technology and techniques are also closely linked to *culture,* via its etymological origins in the Greek term *technē* that means to bring forth something, either as in the ontological definition of the term as "a controlled mechanism for bringing forth and grooming a natural potential" (Geoghegan, 2013, p. 72) or in the aesthetic sense as "gaining insight through cultural and artistic practice" (Bolin, 2012, p. 2).

This relation between culture and technology is often discussed based on the writings of Martin Heidegger where he tried to "reunite technology, technique, and culture within *technē*" (Geoghegan, 2013, p. 74) on the basis of the original meaning of the term as signifying both artistic practice and the way of getting knowledge through these practices (Bolin, 2012, pp. 2–10). For Heidegger (1977), *technē* is linked both to *poiēsis* – the making of something that did not exist before, associated with fine arts – and to *episteme,* meaning knowing or being an expert in. A piece of art or craft, as well as the practices involved in producing it, is in Heidegger's terms a process of knowledge production, or even a *revealing of the truth*:

> It reveals whatever does not bring itself forth and does not yet lie here before us, whatever can look and turn out now one way and now another. Whoever builds a house or a ship or forges a sacrificial chalice reveals what is to be brought forth, according to the perspectives of the four modes of occasioning. This revealing gathers together in advance the aspect and the matter of ship or house, with a view to the finished thing envisioned as completed, and from this gathering determines the manner of its construction. Thus what is decisive in *technē* does not lie at all in making and manipulating nor in the using of means, but rather in the aforementioned revealing. It is as revealing, and not as manufacturing, that *technē* is a bringing-forth. (Heidegger, 1977, p. 6)

—

[13] The German term *Kultur* also differs from the English *culture* by being more or less synonymous with civilization, or the ontological definition of the term (Winthrop-Young, 2014, p. 379).

The relation between *technē* and *epistēmē* shows that the technologies available at a certain point condition what is possible to know about the world, and that the introduction of new technologies expands the possibilities of knowledge, in McLuhan's (1964) terms through extending the human sensory system. Technology, or media, in other words "become epistemology: the grounds for knowledge and knowing itself" (Friesen & Hug, 2009, p. 64; see also Postman, 1986). Again, this includes not only hardware, but also embodied techniques such as language, routines or "ways of doing things" (Bolin, 2012, p. 2), corresponding to the anthropological definition of culture. In other words, the term culture "is already implicit in technē", at the same time as culture "implies the archaic techniques of irrigation, planting and taming, which turn nature into culture" (Vismann, 2013, p. 89).

As pointed out by both Cornelia Vismann (2013) and Erhard Schüttpelz (2006), this makes the concept *cultural techniques* somewhat redundant, since there can be no such thing as a "culture-less technique". But the advance of the term can also be understood as a reminder of the fundamental relation between culture, technology and techniques that have been partly forgotten with the advance of humanistic ideals. Sybille Krämer and Horst Bredekamp argues that the term culture "contains an impulse toward action" but that this understanding of culture as something "done and practiced" over time has been replaced by a more esoteric definition:

> The evolution of the concept of culture, however, 'forgets' its genesis. Over time, the material and technical elements of culture recede further and further into the background, as the term is 'refined' into a cultura animi with the intention of 'spiritualizing' it. (Krämer & Bredekamp, 2013, p. 21).

From this perspective, terms such as *cultural techniques* or *cultural technologies* become a way to readdress the connections between culture and technology. For Göran Bolin (2012), this relationship works in two directions. To begin with, contemporary society can be described as *cultures of technology* "not only marked by high degrees of technological penetration, but also where technology comes to be celebrated as the solution to most problems" (p. 2). This applies not least to the sphere of education where, as we have seen, technology is celebrated as not only solving the problems of education but also as defining them (e.g. Selwyn, 2011a; Selwyn & Facer, 2013; Williamson, 2017). But culture is also a technology in itself, a *cultural technology* seen as a means to achieve certain ends, depending on the dominating social and political ideas (Bolin, 2012, p. 5). Visual arts education

is a good example of this, imagined in the 1800s as a way to make children and young people more disciplined, in the early 1900s as a training in good taste and cultural orientation, and today as creating entrepreneurs for working in the creative industries (Pettersson & Åsén, 1989).

In addition to this *administrative* dimension where culture is deployed as a technology to achieve certain ends, Bolin (2012, pp. 9–10) identifies three other dimensions through which cultural technologies operate today. First, an *expressive* dimension, referring to technologies of communication such as speech, writing or drawing. Secondly, the *social* dimension that includes ways of organizing private and professional life according to certain rules and practices, and third, the *physical* dimension that includes buildings and other materializations of these organizational principles. These dimensions can all be used to understand and conceptualize the role of technology within visual arts education, as a school subject occupied with visual communication and expression, organized in accordance with established educational practices that are reinforced by the school building and, as previously discussed, underpinned by certain imaginaries about what education is and should do.

These aspects, along with the etymological connection between technology and epistemology puts forth education as an important area for studying the relation between technology and culture, that is discussed in the following section.

2.1.2 Technology in education and education as a technology

At first glance, education as a practice based on literacy and cognitive knowledge might seem a far cry from the ontological definition of culture as agriculture or civilization more broadly. But, as Bernard Dionysius Geoghegan has shown in his conceptual investigation, these different definitions of culture could also be understood as "alternate iterations of a shared tradition":

> Both recall the fundamental relationship between culture and *technē*, or the process of bringing forth that must be learned and routinized. To term literacy a culturing technique is to underscore that reading and culture are cultivated and bring forth a certain kind of subject and a certain kind of society through the learning of rote procedures of selection, processing, and reproduction. This problem may be distinct from agricultural engineering but it is not wholly independent. (Geoghegan, 2013, p. 77)

What can be brought from this definition is that it is not just any actions that can be said to constitute culture, but routinized techniques that are being reproduced with the aim of producing or maintaining a certain kind of culture. As Vismann (2013) has shown, this also includes practices associated with cultural heritage considered worthy of protection, such as religious rituals, oral tradition or precisely arts and crafts. To maintain, reproduce and teach these techniques and provide "access to implicit or tacit knowledge", routinized procedures and "rules of execution" have to be developed. In other words: "Reproducibility and learnability are among the key features of cultural techniques. All disciplines grounded in transferable praxis therefore deal with cultural techniques" (Vismann, 2013, p. 87).

Education is one such discipline, grounded in transferable practice, with an aim to maintain or develop a certain culture. Visual arts education further emphasizes the maintaining of techniques associated with cultural heritage, and the articulation of tacit and embodied knowledge. This intimate relationship between culture, practice and technology is more visible in school arts education than in contemporary fine arts or higher arts education. Whereas the latter have more or less abandoned skill training and begun to orient itself towards what art historian Rosalind Krauss (2000, 2010) refers to as the *post-medium condition* – the idea based and mixed media art scene that emerged in the west as a response to the medium-specificity promoted by modernist critics like Clement Greenberg – school art education is still mainly a practice based subject, organized around established, medium-specific techniques and genres (Edling, 2010; Marklund, 2019; Marner & Örtegren, 2014).

What further distinguishes compulsory education from other cultivating processes is the way in which these techniques are selected and motivated. As previously discussed, technologies in the sense of established rules and practices are materialized into other infrastructures such as buildings, but with the emergence of a compulsory school system, these rules also became explicitly expressed in educational material and written guidelines such as curricula and syllabuses. To address the way in which educational material, methods and educators consociate to cultivate a certain learning subject, Kittler (1990) has described them as functions within a *discourse network* in his famous book with the same name. Concentrating on the technology of language, Kittler describes pedagogical practises such as alphabetization and rote learning as cultivation strategies, or even ways of becoming human. On the topic of mothers who teach their children to read via ABC-books he writes that "[a]nyone who could determine the very possibilities of being

human by controlling the primary education of children had attained a transcendental power surpassing all empirical and political conditions" (Kittler, 1990, p. 57).

In this sense, mothers "oriented the entire writing system of 1800" and defined what it meant to be a cultivated human being in the possession of *Bildung* (p. 53).[14] Kittles point is similar to that of Innis (1950, p. 166, 1951, p. 50) that whoever controls the communication technologies in a society also controls the very definition of knowledge, such as how a culture dominated by the parchment medium developed its *monopoly of knowledge* through monasticism, concentrating education and knowledge production to the church.[15] This further means that regulations concerning information and communication technologies can be considered "epistemological policy" (Braman, 2012), and that contemporary digitalization policies – not least those targeted at the educational sector – to a large extent are in the business of defining knowledge and what it means to be educated.

This applies of course also to older "information policy", such as the pedagogical reforms of the 1900s where language as a communication technology was taken apart and constructed into standardized models of learning how to read, speak or listen properly. Kittler (1990) describes these reforms as a break with earlier discourse networks concerned with subjectivation and Bildung, where instead of asking "what people would be capable of if they were adequately and affectionately 'cultivated', one asks what people have always been capable of when autonomic functions are singly and thoroughly tested" (p. 214). In other words, the "pedagogical uncoupling of the cultural-technological subroutines" took place at the expense of their cultivating qualities (p. 216). This debate on the de-contextualization of knowledge and skills aligns with McLuhan's (1964, p. 241; McLuhan & Fiore, 1967, pp. 100–101) critique of the curriculum fragmentation in schools taking place with the rise of standardized pedagogy, as well as with contemporary debates about how technologies for evaluating and monitoring learning risks excluding some form of knowledge (Biesta, 2010). For the study at hand, these works have been important in understanding the

—

[14] The term Bildung is used in this dissertation to describe a continuous process of personal growth and development, closely linked to humanistic ideals and often juxtaposed to more instrumental approaches to education as vocational training (Burman, 2014, p. 9).

[15] As Peters (2015b, p. 21) and others have noted, this means that medium-specific skills in handling dominant communication technologies, such as those performed by the monks and nuns in the monasteries writing and copying texts into parchment codices, is at the base of each civilization, making Innis work "a theory of cultural techniques *avant la lettre*" (Young, 2015, para. 33).

relation between educational imaginaries and the discourse networks of schools from a historicizing perspective.

Another key theme in *Discourse networks* is the idea that established technologies become visible only when new communication technologies are introduced. As Kittler (1990) describes, it was only after the introduction of the typewriter which "unlinks hand, eye, and letter" that handwriting became recognized as a medium in its own right (p. 195). For this study, it means that the introduction of mechanical and digital technologies in visual arts education have made visible the specific qualities of traditional techniques used in the subject, such as drawing and painting. These technologies used to be taken for granted but are now made visible against the background of a new digital infrastructure.

Kittler's approach in this book is inspired by Foucault's archaeological method but modified from the insistence that media technologies are structuring culture and discourse rather than the other way around. Without technologies used to process, store and transmit signals, Kittler argues, the discourse said to organize human subjects is not possible: "no discourse without pens, paper, and typewriters, no archives without recording media and address systems, no governmentality without files" (Young, 2015, para. 3). Insisting that media structures and shapes culture and society often leads to accusations of *technological determinism,* best described as the tendency to see all social and cultural change as technology driven, downplaying the human agency involved in these processes.

This epithet, also associated with McLuhan, has been famously compared by Winthrop-Young (quoted in Parikka, 2012) as getting the reputation of someone who "enjoys strangling cute puppies" (p. 174-175), and indeed Kittler has become infamous for his anti-humanism and attempts to write "media studies without people" (Peters, 2010, p. 5). While not subscribing to this reductionist perspective, I agree with Peters *(2017)* who argues that to "keep denouncing technological determinism in our moment is to risk a mistake graver than granting agency to devices – that of giving up on critique, that is, reflection on conditions of possibility" (p. 22). In an educational context this means that by treating educational technology as mere tools that can be used as desired, the biases and structuring qualities of these technologies risks passing unnoticed, leaving education in the hands of corporate interests. Both Peters and Winthrop-Young have further discussed the technology focus of both Kittler and McLuhan as a kind of "anti-dotal thinking", emerging in response to the dominance of social and hermeneutic perspectives on media. For Winthrop-Young, the more recent

development of the concept of cultural techniques in German media studies fulfils a similar function, to balance a Kittlerian tradition that perhaps too successfully managed to get rid of people:

> Granted, like Harold Innis and Marshall McLuhan, Kittler may have gone overboard, but this was inevitable given that, prior to his arrival, the boat was threatening to capsize on the other side. The concept of cultural techniques, while deployed far less polemically than the Kittlerian media absolutism of the 1980s and 1990s, promises a similarly productive counterbalance. (Winthrop-Young, 2014, p. 377)

In this dissertation, the concept of cultural techniques holds a similar balancing function, namely to discuss the structuring qualities of media without disregarding human agency and action. The concept is defined here as including a more "administrative dimension" (Bolin, 2012, p. 5) of visual arts education as a technology used to create a certain kind of society or citizen (Geoghegan, 2013), as well as in the more narrow sense as techniques used in "symbolic work" and art making practices (Macho, 2013, p. 30).

In addition to this broad concept, the dissertation also uses the slightly narrower term *logistical media*, defined by Case (2010) as "media of orientation" that "have to do with order and arrangement first, and representation second, if at all" (p. 1). Logistical media share with cultural techniques the interest in ontological operations "in which devices and techniques process logistical distinctions that establish concepts like time, space, being and 'media' itself" (Young, 2015, para. 26) or even "prepare the ground on which we can make such distinctions as nature or culture" (Peters, 2015b, p. 37), but instead of including all kinds of procedures and technologies, logistical media refers specifically to technologies involved in structuring time and space, having no content in themselves but the power to arrange other media (Peters, 2015b, p. 37). In short, the concept *logistical media* is used here to distinguish media without content in a practice otherwise dominated by technologies for representation or communication, that is visual arts education, while *cultural techniques* is used more broadly to further an understanding of images and image making not just as an expression of culture in the aesthetical meaning, but also as a mode of knowledge production manifested through silent processes of handling material and technologies (Krämer & Bredekamp, 2013, pp. 21–23; Latour, 1998, pp. 424–425).

The broad definition of media used in medium theory, as well as in theories of logistical media and cultural techniques, seems well suited to the study of visual arts education, a practise organized around as well logistical

media such as timetables and or school buildings and cultural techniques involved in "symbolic work" such as painting, drawing or 3D printing. Indeed, the term *medium* is established within visual arts to describe precisely the "interlocking supports and layered conventions" of an artwork, that is material objects and techniques used to facilitate artistic practice, as well as different *forms* of art, each with a legacy of traditions (Krauss, 2000, p. 44). Although traditional art media might be mostly about recording or transmitting information, as is the case of pre-photographic painting used both to document and to distribute images of power, they also have logistical characteristics. Let us consider painting, a time consuming and somewhat messy medium, dependent on water and good lighting conditions. As one of the central techniques within traditional visual arts education it has restructured the way education is organized, for example through making longer lessons to allow for preparations, and through designated "studio like" art classrooms with running water and big windows to get as much daylight in the room as possible. In the same way, later technology such as digital devices demand restructuring of the classroom to ensure "dry zones" and access to electrical power.

The infrastructures involved in cultural production and education are further shaped in relation to other social and economic systems. As shown by sociologist Howard Becker (2008, pp. 93–94) in his sociological analysis of different "art worlds", artistic production is dependent on complex distribution systems where "specialized intermediaries" provide certain stable conditions under which art can be produced, and bring the finished work to the public. These social aspects of media, including ownership, politics and the possibility of resistance, are not very visible in the theories presented here. To address how cultural techniques and media technologies are part of a larger sociotechnical system, the next subchapter will therefore develop the concept of infrastructures.

2.2 Infrastructural perspectives

The previous subchapter took Peters' conceptualization of media as "enabling environments" as a point of departure to discuss the relation between culture, technology, embodied skills, education and "ways of knowing". This metaphor is also useful for introducing the concept of infrastructure as employed in this dissertation. As Ursula Heise (2002) has shown in her discussion about ecological metaphors in media theory, the notion of media as environment or ecology is often used to emphasize a holistic perspective

on media in relation to culture and how the latter changes when a new communication technology is introduced, "a mode of reasoning that foregrounds the whole in its internal interconnectedness and equilibrium" and that "also entails an emphasis on how changes in a single variable alter the configuration of the whole" (p. 156).

This systemic perspective to a large extent characterizes the medium theory and Germanophone research tradition discussed above, emphasizing how the introduction of a new technology changes, as it were, the very ecosystem of that environment. But on an opposite note, the term ecologies can also be used to emphasize a local perspective and the specificities of a particular system (Heise, 2002, pp. 164–165). This is often the case in the body of literature discussed in this subchapter, exploring how global imaginaries and technologies are "re-embedded into local constellations of productions and practice" (Jasanoff, 2015b, p. 333), or as put by Parks and Starosielski (2015): "Media infrastructures may be centrally owned by nation-states or corporations, but their edges are imagined, arranged and adopted in different ways by people or 'end users'" (p. 11).

Heise (2002) conceptualizes the difference between these approaches as a move from a metaphoric use of the term in the sense of a system, to a spatial approach to media environments that "include a consideration of how they relate to other types of environments" such as urban settlements or nature (p. 165). The latter discussion on environmental impact is pervading in critical infrastructure studies exploring "the materials needed to build, operate, and sustain massive systems of content distribution" (Parks & Starosielski, 2015, p. 14) as well as in work discussing how nature has been shaped in relation to technical and cultural development (Carse, 2012; Parikka, 2015; Peters, 2015a).

Conceptualizing media as environments further suggests that this broader cultural ecology is, at most times, invisible to its inhabitants (Heise, 2002, p. 157). It puts forth media as a naturalized and mundane part of life, that we care about or notice as little as the air we breathe or the rocks on the ground. This notion, along with the call to make environments visible, is identified by Peters (1999, p. 38) as a "classic concern of media theory", spanning across medium theory, the work of Kittler and infrastructure studies. The latter body of research has further investigated the processes and negotiations through which environments become invisible, and the

work involved in keeping them running in the background (Bowker & Star, 1999, p. 41; S. J. Jackson, 2014; Marvin, 1988).[16]

Based on this short conceptual walkthrough, the notion of media as environments can be understood as a way to establish coherency in the theoretical framework used in this dissertation, emphasising the invisible and structuring qualities of media technologies, and their embedment in both global systems and local settings. At the same time, the inconsistent use of the term reveals a difference in how separate research traditions theorize around social and political aspects of technology, including environmental concerns and inequality issues. This subchapter aims to map these more sociotechnical perspectives and put them in relation to the literature discussed in the first part of this chapter, starting with 1) a definition of infrastructures as a relational and path dependent concept, followed by 2) a discussion of the invisibility of infrastructures and 3) how they can be made visible to enable critical scrutiny and the emergence of new and fairer infrastructures.

2.2.1 When is an infrastructure?

After expanding the concept of media to include almost anything that mediates or structures life, and introducing concepts aiming to describe moments prior to media, it might seem redundant to introduce yet another concept that goes beyond or below that of media. However, the concept infrastructure is used here because it articulates what seems to be implicit in much medium theory, namely that media technologies only matter when they are embedded in larger systems of human labour, politics, standards and discourse, in other words *when infrastructures emerge*. The term *infrastructure* is used in contemporary media research as a relational concept, describing far reaching systems, embedded in other technologies, structures and social arrangements that emerge for people in practice. In other words, as Susan Leigh Star and Karen Ruhleder (1996) suggest, in their often cited definition of the concept, we must ask "when – not what – is an infrastructure" (p. 113). The relationality of the concept means that infrastructures are *both* technical and social and "must be understood in their entirety, as hybrids that join and rely on elements too often separated under the (bogus) headings of 'technical' and 'social'" (Edwards et al., 2013, p. 12).

—

[16] On an opposite note Brian Larkin (2013) has shown that while many infrastructures are indeed taken for granted and in that sense "invisible", others are designed as promises of a desired future and made to be highly visible. This aspect of infrastructures are further discussed in chapter 2.2.3.

The hybrid nature of the infrastructure concept makes it yet another broad category, that also includes "soft" systems of organization and knowledge. In other words: "Beyond bricks, mortar, pipes or wires, infrastructure also encompasses more abstract entities, such as protocols (human and computer), standards, and memory" (Bowker et al., 2009, p. 97). The soft infrastructures discussed in this study include established standards used in education such as the division of different school subjects and school forms, written guidelines including curricula and policy and also more elusive elements such as the shared memory of past traditions within a certain school subject. Conceptualizing these entities as infrastructures rather than, for example, discourses or experiences has been helpful in understanding how more abstract categories also emerge in relation to organized practice and become materialized, such as how the shared memory of visual arts education is materialized in the art classroom and maintained through pedagogical practice.

Much of the work on soft infrastructures comes from the field of STS where researchers have drawn attention to infrastructures involved in knowledge production, including the social and institutional structures of science and laboratories (Latour, 1987), methods of standardization and collaboration (Star & Griesemer, 1989), and classification systems (Bowker & Star, 1999). Researchers in this field have further been keen to emphasize the human labour involved in the emergence of infrastructures and have been important here in the conceptualizing of the role of the teacher in the maintenance and reshaping of educational infrastructures. To draw attention not only to how infrastructures emerge in organized practice, but also to how they are negotiated and configured in these processes, STS researchers have used the concept *infrastructuring* (Bowker & Star, 2002; Karasti & Syrjänen, 2004; Pipek & Wulf, 2009). As emphasised in the afterword of a special issue devoted to this concept, infrastructuring does not refer to the design of technologies or infrastructures in a traditional sense, nor how "users" as a fixed category adapt to predetermined technologies, but how these entities and relations are configured in a reciprocal process:

> And this is the central fact about 'infrastructuring' – it is not that the act of building an infrastructure ever simply ratifies pre-existing relationships: the act of infrastructuring changes what it is to be a road, a unit of currency or an ecology. Infrastructures are engines of ontological change. They stand between people and technology and nature and in so doing reconfigure each simultaneously. Core to our vision for these special issues has been an under-

> standing of the perpetual refiguring which is at the heart of infrastructuring. (Karasti, Pipek, & Bowker, 2018, pp. 270–271)

The concept have also been used by Julia Velkova (2017) to describe how artists develop working environments in order to enable certain actions or routines related to their creative work, drawing on a definition of infrastructuring as "cultural, economic and technological practices that are oriented towards the reconfiguration of existing hierarchising arrangements brought about through media technologies and infrastructures", resulting in "shifts in the arrangements between technologies and the users of these technologies" (p. 103). This dissertation uses the term in a similar way to describe micro-scale processes of reconfiguring infrastructures, and also as a kind of umbrella concept for the interaction between infrastructures and the educators, involving a range of sensibilities, imaginative and pedagogical abilities, discussed further on in this chapter.

Certainly in the case of local configurations of infrastructure, but also when it comes to more established actors investing in infrastructures "there is no guarantee that the best set of standards will win" (Bowker & Star, 2002, p. 155). The reason for this is simply that infrastructures, by definition, are deeply embedded in existing infrastructures and practices with whom the "new" system must align in order to get accepted as a new standard. The prefix *infra* itself suggest a structure that lies *under* other systems or practices and, in line with the etymology of the word, it is often observed that infrastructures are *layered*, covered by another structure, practice or built environment that follows the path of that underneath:

> New infrastructures do not so much supersede old ones as ride on top of them, forming physical and organizational palimpsests – telephone lines follow railway lines, and over time these pathways have not been diffused, but rather etched more deeply into the urban landscape. (Varnelis, quoted in Mattern, 2015, p. 105).

This also applies to obsolete infrastructure that, although it is no longer used for its original purpose, still structures and determines new systems for storing, processing or transmitting information. This *path dependency* is often exemplified with hardware systems, as in the example above (that can be continued with optical fibres, which, in turn follow the telephone lines) or how internet is dependent on a reliable electrical grid (S. J. Jackson et al., 2007; Mattern, 2015, p. 105; Star & Ruhleder, 1996, p. 113). Then again, infrastructures do not neatly replace each other or follow the exact same

paths. Standards and systems overlap, break and compete and are in themselves historical processes of negotiation and constant reshaping (Edwards, 2003, p. 222). These struggles are rarely visible in mainstream narratives of the past, where technological developments appear as similar to a linear and smooth progress. A historicizing approach to media infrastructures thus means recognizing not only how technical networks and standards are shaped by their predecessors, but also how the past is constructed to fit the present (Bowker & Star, 1999, p. 113; Edwards, 2003).

In this dissertation, it means understanding dominant narratives of past traditions within visual arts education, not as a fixed background, but as a dynamic infrastructure used to motivate present pedagogical practices as well as to imagine new ones. A sensibility to path dependence further helps to understand the ways in which these relations have emerged over time, and what has been forgotten or contested under different socio-political conditions. However, implicit in the concept of layering is that the followed paths are pushed into the background, covered by new systems and technology. This invisibility of infrastructures, one of the most recurring and discussed topics in infrastructure studies, is expanded on in the following section.

2.2.2 The invisibility of infrastructures

The elusiveness of infrastructures is often explained by their ubiquity and the fact that they are linked with conventions of practice. To become what Star and Ruhleder (1996, p. 113) call members of a certain community of practice, individuals must attain a naturalized relationship with the objects and standards of that infrastructure, or in other words, cease to see them. This is true for professional communities, such as teachers, as well as for larger social communities, where the know-how of infrastructure is what makes us feel at home in a society, or as put by Paul Edwards (2003): "Belonging to a given culture means, in part, having fluency in in its infrastructures" (p. 189). The starting point for many studies of infrastructures is thus often to foreground these invisible systems, in what Bowker and Star (1999, p. 34), refer to as an *infrastructural inversion*.[17]

Infrastructures can also be *made invisible*, in a conscious process of obscuring surveillance, ubiquity or plain ugliness that Parks (2010, para. 10) discusses as *infrastructure concealment*. Not least within education techno-

—

[17] The concrete approaches for achieving such "infrastructural inversion" in this study is discussed in the method chapter.

logy and policy, there is a tendency to focus on the user aspect of technologies and for both the school world and industry to strive to make technologies as invisible and seamless as possible, for teachers as well as students.[18] Although there might be aesthetical reasons or users concerns behind efforts towards infrastructure invisibility, what is concealed in this politics is not only messiness but also the choices and priorities embedded in these systems, leaving citizens little opportunity to access and negotiate these biases. As Parks puts it:

> While concealing infrastructure sites may be a viable aspect of urban planning (as has long been the case of sewer, electricity and water systems), one of its effects is to keep citizen/users naive about the systems that surround them and that they subsidize and use. Because of this, it is important to devise other ways of visualizing and developing literacy about infrastructures and the relations that take shape through and around them. (Parks, 2010, para. 8)

I will return to the idea of infrastructure literacy shortly, but first it must be established that infrastructures are not invisible at all times and for everyone. Related to the invisibility debate, and also derived from the Star and Ruhleder (1996) text, is the often-repeated idea that infrastructures become visible at breakdown. A power failure at work makes us recognize the importance of infrastructures supporting such systems as electric light, internet and electronic locking systems as well as soft infrastructures such as professional practises. But if infrastructures become visible when they break or malfunction, this also means that they are constantly visible for those working at preventing or fixing breakdowns. Accordingly, a growing body of research has come to explore the role of repair and maintenance of infrastructures. In line with the invisibility of the structures themselves, it is argued that the work put into maintaining and developing infrastructures is often underestimated or even ignored, in favour of more appealing narratives of innovation and newness (Downey, 2014; S. J. Jackson, 2014; Parks & Starosielski, 2015, p. 11). In other words, this research stresses that infrastructures are not machines that run without maintenance but are dependent on human work for repair and configuration.

—

[18] As an example, it is stated in the Swedish digitalization policy for the educational sector (Swedish National Agency for Education 2015, p. 108) that one important issue when it comes to IT as an administrative tool for teachers is to "make technology as invisible as possible" (see Forsler 2018b for further discussion).

In developing areas, people often function as infrastructure themselves by compensating for insufficient infrastructure with shadow development or just plain physical labour (Mattern, 2015, p. 106, 2016, p. 5; Parks, 2015b, p. 123; Simone, 2004). Local configuration, in the form of workaround or creative practices, also takes place when established practices do not match prescribed categories and imposed standards (Bowker & Star, 1999, p. 159; Suchman, 2002, p. 94). Star and Strauss (1999) refer to this invisible process of making things fit as *articulation work*, "work that gets things back 'on track' in the face of the unexpected, and modifies action to accommodate unanticipated contingencies", often associated with domestic work or gendered occupations such as nursing (p. 10). Teachers are discussed in this dissertation, both as infrastructure workers, performing articulation work, and as infrastructure in themselves, mediating knowledge and manually managing the logistics of the classroom.

Acknowledging such "invisible work" is also a way to make visible users and practices not prioritized by the system, the "other" that called for articulation work in the first place (Bowker & Star, 1999, p. 39, 310; Edwards, 2003, p. 190; Star & Strauss, 1999, p. 21). In addition to people who perform invisible work in order to repair infrastructures, or to make them fit with other systems or established practices, infrastructures are also visible for this "other", a person or a group not included in the design of infrastructures (Star, 1991). As an example of when "specific conditions of usability are overlooked", Bowker and Star (2002) take the case of people in wheelchairs moving around in urban infrastructures designed for able-bodied people and where architectural elements designed to be invisible, such as sidewalk borders or small steps, become impassable obstacles. Art teachers too have other needs than most teachers, often being the sole teacher in their subject at a school, meeting far more pupils every week than their colleagues do, and working with images rather than text.

In this dissertation, the relation to infrastructure gained from not having your needs met is described as a sensibility, and the ability to act on and articulate this sensibility as *infrastructural imagination* (S. J. Jackson et al., 2007). Some of the workarounds and repair performed by art educators to make up for insufficient equipment and fitting also results in new infrastructures. This development of systems and the repurposing of existing infrastructures, that happens when established institutions fail to provide sufficient support, is referred to by Shannon Mattern (2015, p. 106, 2016, p. 5) as *shadow development.* Together with the previously discussed concept

articulation work, these concepts describe different approaches and modes of infrastructuring.

Theories about infrastructures as constituting society, and at the same time being dependent on human work and specific skills, provide some supplementing perspectives to the previously discussed theories of media as organizing time and space. As Siegert (2015) has shown, "[e]very culture begins with the introduction of distinctions: inside/outside, pure/impure, sacred/profane, female/male, human/animal, speech/ absence of speech, signal/noise, and so on", distinctions "processed by media in the broadest sense of the word" (p. 14). These in-between media are for Siegert "basal cultural techniques". Infrastructures are ascribed similar civilizational characteristics by Edwards (2003), who states that "[t]o construct infrastructures is simultaneously to construct a particular kind of nature, a Nature as Other to society and technology" (p. 189), but whereas analyses of cultural techniques have furthered understanding of how these distinctions have come in to being in the first place, theories of infrastructure allow us to think about what visions of culture and society underpin the creation, managing and maintenance of these systems of distinction.

The cultivating aspirations of education were discussed in the previous subchapter through the lens of cultural techniques as a bringing forth of a certain subject, emphasising schools as maintaining and refining culture. But there is also a more political, visionary and future-oriented aspect of the relation between technological development and education that is discussed in the last section of this chapter.

2.2.3 Sociotechnical imaginaries and the visualization of infrastructures

The formation of infrastructures, whether we are talking about roads, broadband cables or computer systems for evaluation of education are always connected to a certain image, or dream, about the future (Blomquist & Jacobsson, 2002; Larkin, 2013; Ribes & Finholt, 2009). This means that the supposed invisibility of infrastructures is sometimes challenged by an opposite phenomenon, where infrastructures are exhibited as a promise of modernity, or as put by Brian Larkin (2013): "Invisibility is certainly one aspect of infrastructure, but it is only one and at the extreme edge of a range of visibilities that move from unseen to grand spectacles and everything in between" (p. 336).

In addition to something functioning in the background as an embedded part of everyday life, infrastructures can also be used as symbols for de-

velopment and progress belonging to "a common visual and conceptual paradigm of what it means to be modern" (Larkin, 2013, p. 331). This common paradigm underpinning investments in infrastructures is conceptualized by Sheila Jasanoff and Sang-Hyun Kim (2015) as *sociotechnical imaginaries,* defined as "collectively held, institutionally stabilized and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order, attainable through, and supportive of, advances in science and technology" (Jasanoff, 2015a, p. 4).[19] In education, such *sociotechnical imaginaries* underpin the formulation of the national curriculum, the design of school buildings, and the development of educational technology that in turn structure educational practice and identities.

The concept is mainly used in the third analytical chapter used to address future visions in education as they are played out in-between policy, technology and educational practice, or more concretely, to describe the assumptions behind the development and use of educational technology. I further use the term *educational imaginaries*, developed by Rahm (2019, p. 63) to discern the visions of education involved in the implementation and negotiation of new technology. The concept "new technology" is intentionally relative, pointing to the fact that all media technology was once new, while the visions behind and motivations for implementing this "new" technology seem more continuous.[20] But most important, new technology is connected to change and progress, as explained by Carolyn Marvin:

> People often imagine that, like Michelangelo chipping away at the block of marble, new technologies will make the world more nearly what it was meant to be all along. Inevitably, both change and contemplation of change are reciprocal events that expose old ideas to revision from contact with new ones. (Marvin, 1988, p. 235)

—

[19] The acknowledgment of materiality in social science and humanities has made the concept imaginaries increasingly popular, not least within STS. As the body of research exploring such materialized imaginaries expands, so does the number of concepts used to describe them, such as "technoscientific imaginaries" (Marcus, 1995), "sociotechnical imaginaries" (Jasanoff, 2015a) or "infrastructure imaginaries" (Parks, 2015a). Common for these concepts is the struggle to make visible prevailing ideas about technology development: what technology is, and what kind of society it is built for. See McNeil, Arribas-Ayllon, Haran, Mackenzie, & Tutton (2017) for a more thorough review of the use of imaginaries in STS.

[20] Such recurring imaginaries include technical qualities such as speed, capacity and performance as well as more speculative imaginaries of disembodiment and mind control (Parikka, 2012, pp. 11, 55).

In education, this imaginary is expressed through the belief that "new" digital technology will fundamentally change schools as we know them and make learning more personalized and efficient (Chan, 2019; Cuban & Jandrić, 2015; Player-Koro, 2018; Selwyn & Facer, 2013; Sims, 2017; Williamson, 2017). To discuss these media technologies perceived as new, the dissertation draws on Marvin's (1988, p. 6) definition of "new media" as new communication technologies used for old or new purposes, or old technologies used in a new way. According to Lisa Gitelman (2006, p. 6), the introduction of new technologies also includes an element of conflict or lack of agreement upon how to use it. In order for this use to be determined and for a technology to become successfully integrated in society, the technology as such must become invisible for the users in favour of the phenomena or content. This relates back to the debate about infrastructures as invisible, and also towards the division between users and developers of technology.[21]

Although sociotechnical imaginaries are collectively held, they do not only operate on a global or national level but can take shape within smaller communities, such as organizations or professional groups. This means that multiple imaginaries can coexist within a society, and further, that the negotiation between contradicting visions is a point where imaginaries become visible and allow for critical analysis (Jasanoff, 2015b, pp. 329–332). Following this definition, the field of visual arts education can hold multiple, contradicting imaginaries but also imaginaries separate from those in other educational areas. Such contradictions involve the conflict between desired futures and the resistance against undesired such. As Ulrike Felt (2015) has shown, technological resistance can be understood as a collective imaginary about the public good as well as an imaginary constitutive of a specific identity. For this study it means that the choice *not* to employ certain technologies within art educational practice is as important as the decision to do so, and that such resistance can be scrutinized for visions of a desired future society or as part of a professional identity.

—

[21] As Marvin (1988) demonstrates, this relationship can also be historicized, in her case through looking at how electrical experts emerged as an elite category in the late 19th century. Since new technologies were associated with progress and change, the technological literacy of these experts became a "monopoly of knowledge" (Innis, 1950, p. 166), used to strengthen their own position and reproduce existing social order. In other words, technology and infrastructures materialize prevailing social structures and cultural imaginaries and as such also helps to reproduce them (Suchman, 2002, p. 226).

Resisting technology implementation also means recognizing the agency of otherwise invisible systems and technologies, which brings us back to the notion of *infrastructure literacy,* suggested by Parks as a way to create citizen awareness and engagement around infrastructures. Discussed in relation to the concealment of infrastructures, Parks (2010) emphasizes the importance of visualization as part of the process of creating knowledge "about infrastructures and the relations that take shape through and around them" (para. 8), including not only the physical uncovering of infrastructures in public spaces but also different modes of representing or evoking hidden structures and systems, such as maps, photographs and films or even artworks, that can then be used to facilitate critical discussions and civic participation in the development and reshaping of media infrastructures (see also Mattern, 2013; Parks, 2013, 2015a).

The notion that artistic practices can help reveal hidden structures and embedded biases points back to the initial discussion in this chapter, based on Heidegger's (1977) understanding of *technē* as a form of revealing or "bringing-forth", but also to McLuhan's (1964, p. 10; 1967, p. 68) idea of art as "anti-environments" that can make visible the taken-for granted aspects of a culture or society. By extension, this can also be related to visual arts education as a school subject based on cultural techniques for image making and visualization. The definition of media as enabling environments emphasizes the invisibility and embeddedness of technologies in the organization of private and professional life. Embodied skills performed in relation to media and material are part of this invisible technology but can also be facilitated to make it visible. From this perspective, visual arts education, centred around technē as a way of knowing, stands out as a node that connects both the reproduction of culture and ways to make this process visible.

To sum up, the term *infrastructure* is used in this dissertation as a relational concept emerging in organized practice, including also "soft" systems of organization and knowledge (Bowker et al., 2009, p. 97; Star & Ruhleder, 1996, p. 113). Concepts and perspectives from this field and related traditions such as STS, are used throughout the study to emphasize the shift from a culture dominated by a particular medium (c.f. Innis, 1951; McLuhan, 1964) to a culture characterized by convergence (Jenkins, 2008) and "deep mediatization" (Couldry & Hepp, 2017) but also more specifically to address the issue of visible and invisible work within the teaching profession. This dynamic is brought up in chapter six and seven that relies on a range of concepts drawn from STS and infrastructures studies to discuss how art

teachers make use of, negotiate and configure educational infrastructures emerging in processes of school digitalization.

These concepts, broadly referred to as *infrastructuring,* include 1) *articulation work*, used here to describe the workarounds and configurations performed by art teachers to manage their everyday work, and also to discuss how this management includes strategies of visualization or articulation of subject specific knowledge, 2) *shadow development* distinguishing practices that lead to the emergence of new infrastructures, and 3) *infrastructural imagination,* representing a more visionary approach that includes also the social aspects of infrastructures. The concluding chapter further discusses how this imaginative ability can be rearticulated into a pedagogical approach, referred to as *infrastructure literacy*. The infrastructural perspective has also informed the methodological approach, discussed in the following chapter.

2.3 Summary

- The theoretical framework of *infrastructuralism* combines theories and concepts from medium theory, media philosophy, Germanophone media theory, infrastructure studies and STS.
- Common to these theoretical traditions is a broad definition of media (including devices, systems, built environments, practices, skills and social organization), an emphasis on media *as* environments and on the invisibility of these environments, and an interest in the relation between media and social/cultural development.
- Germanophone media theory, medium theory and media philosophy have furthered a historical approach to media and how media technologies are preceded by different practices that broadly speaking can be said to constitute culture. Infrastructure studies and STS assume a more sociotechnical perceptive and discuss infrastructures as a relation emerging in organized practice.
- The concept *cultural techniques* is used here to discuss how technologies within visual arts education have been understood in relation to the organization and perceived aim of education more broadly, while the term *logistical media* is used to distinguish media without content in a practice otherwise dominated by technologies for image making.

- A conceptual apparatus (including *articulation work*, *shadow development* and *infrastructural imagination*) has been derived from the term *infrastructuring* to describe how art educators relate to and enable different media technologies within their subject, and to discuss the dynamics of invisible work and visualization within this profession.
- The concept *sociotechnical imaginaries* is drawn from STS to refer to collectively held perceptions about desired futures and how they are materialized in technology development, used here to address the political aspects of infrastructures as underpinned by shared visions of social development and order.
- These theoretical traditions are linked to visual arts education through connections with the Greek term *technē*, meaning the bringing forth of knowledge about the world through artistic practice, used in this dissertation to discuss visual arts education as a place to bring forth and develop knowledge about invisible media environments and infrastructures, conceptualized here as *infrastructure literacy*.

CHAPTER 3

Managing an infrastructural inversion

If we accept the idea that infrastructures – despite sometimes taking the shape of "grand spectacles" (Larkin, 2013, p. 336) – often recede in the background, this means they are hard to study. As Bowker and Star (1999) have shown, this applies especially to established and well-functioning systems: "The easier they are to use, the harder they are to see" (p. 33). The idea that the familiar tends to escape attention is also described by McLuhan (1977) who uses the concepts *figure* and *ground* to discuss how some elements in our lived experience advance in the foreground and in fact "monopolize the viewer's attention" (p. 8) while the underlying structure stays invisible.

At the same time, argues McLuhan, the ground provides the conditions for what we perceive as figure, and to truly understand the role of media in culture and society, media researchers must shift attention from the more visible media representations and text and consider the environments that enable them. This quest in medium theory to make environments visible is echoed in the method of *infrastructural inversion*, suggested by Bowker and Star (1999), "recognizing the depth of interdependence of technical networks and standards, on the one hand, and the real work of politics and knowledge production on the other" (p. 34). In both cases, the authors emphasize the need to not only switch attention to the infrastructure or ground, but also to eventually obtain a "double vision" (Bowker & Star, 1999, p. 37) in order to "perceive figure and ground together" (McLuhan et al., 1977, p. 10).

Indeed, this calls for interventionist, experimental and exploratory approaches, making infrastructure studies "a nesting ground for innovative research methodologies" (Parks & Starosielski, 2015, p. 16). Within this field, Parks (2015a) has developed a critical methodology for a humanities based study of infrastructures, combining infrastructure visualizations, site visits, interviews and participatory elements such as workshops. Inspired by this

approach, as well as by visual ethnography and participatory methods, this dissertation uses a mixed methods framework consisting of interviews, participatory drawing workshops, online and offline site visits and video walks.

While all qualitative research to some extent tries to get beyond the obvious, the idea of an infrastructural inversion has been useful in this dissertation in maintaining a double perspective, looking at both hidden structures and more established visions of visual arts education. More concretely, the video walks and part of the interviews have been a way to foreground the hidden work and negotiations involved in the emergence of infrastructures. The drawing workshops were in turn used to map resistance and imaginations in relation to media technologies and the built environment. In the analytical phase, these more hidden aspects have been read in relation to the "figure" of visual arts education, that is the official accounts and institutional memories of the historical development of the subject in the art teacher community, expressed in the interviews as well as in previous research. These different phases in the research process are described in this chapter, along with an overview of the material and a discussion on ethical and practical considerations.

3.1 Collection and overview of material

The empirical material for this dissertation was collected between 2015 and 2019 at different sites related to visual arts education in Sweden and Estonia, such as university institutions for teacher training, art schools, primary and secondary schools and online spaces where art teachers can collaborate and share material. Each individual interviewee, workshop and video walk is numbered, and referenced in the footnotes according to this system: type of material + nation + number. Interview number three performed in Estonia is then marked iE3, while the second workshop performed in Sweden is referred to as wsS2. The table in figure 1 is a summary of the material and the professional position of the participants:

	Sweden (S)	Estonia (E)	Total
Interviews (i)			
Total[22]	**12**	**16**	**28**
Art teacher educators	6	14	
School art teachers	4	8	
Extracurricular art teachers/managers	2	5	
Producers of educational material	5	3	
National curricula authors	1	2	
Video walks (vw)	3	5	**8**
Workshops with student teachers (ws)	4	4	**8**

Figure 1. Table overview of material.

Most of this material was collected between 2015 and 2017 in the institutions that train art teachers, regarding those as central places for remembering and negotiating past traditions, as well as educating art teachers for the schools of tomorrow.[23] The fieldwork also includes visits to places and events outside the university where visual arts education is discussed and developed, such as compulsory schools, art schools and art education conferences.[24] These site visits were documented using digital photography and field notes. Field work notes (including quotes) are not numbered but contextualized in the running text. The material also includes found documents such as templates or extracts from textbooks in visual arts education.

I also followed art teacher discussions online during the same period (documented through screenshots).[25] As discussed by Hammersley and Atkinson (2007, p. 138) such "naturally occurring" online communities can

—

[22] Note that some participants belong to multiple categories. The number of occupations or positions is therefore bigger than the total number of interviews.

[23] These institutions included: Tallinn University (EE), Tartu University (EE), Estonian Academy of Art (EE), Södertörn University (SE) and Konstfack University College of Arts, Crafts and Design (SE). In Estonia, the represented institutions were the only ones offering programmes for art teacher training. In Sweden, the institutions were selected to represent one university specialized in arts and one multidisciplinary university, where the former provides full five-year programmes in art teaching (targeted towards teaching art in grades 6 -12) and the latter one semester art specializations for recreation instructors (targeted towards teaching art in grades K-6).

[24] In Estonia I visited two compulory schools, one extracurricular art school and one student art exhibition/conference. In Sweden, I visited two compulsory schools, one school media center and two art teacher meetups.

[25] In Estonia, I followed two Facebook groups, one teacher blog and three state run sites for online teaching materials, and in Sweden, ten Facebook groups and three teacher blogs.

prove more dynamic than offline spaces when it comes to certain research populations. In the case of art teachers, online spaces might make up for the lack of local colleagues and be the main place for them to discuss subject specific topics and challenges. The information flow in some of these spaces is therefore intense, and a *focused approach* (Knoblauch, 2005) was used to target discussions or material specifically about the relation between media environments and visual arts education, as well as more overarching questions about the aim of the subject. This approach, where the short time visits are compensated by an intensive collection of data, to some extent characterized all the field work. According to Knoblauch (2005), a focused approach demands some kind of background knowledge about the field, in this case made up by my own professional background as an art teacher. This background knowledge was not only valuable in order to focus certain aspects of the research problem, but also to get access to the field (discussed further on in this chapter), and eventually to create situations where the focused topics could be discussed.

These constructed situations generated both verbal and visual material and relates to a methodological strand sometimes referred to as *visual methodologies*; a common denominator for approaches that emphasize the role of images in knowledge production and meaning making. Grounded in an understanding of knowledge as embodied and material, visual methodologies offer a supplementing perspective to the mainly text and language bias approaches in social and humanities research (Fors & Bäckström, 2015, p. 26; Gauntlett, 2007, p. 107). Extending the data collection with visual methods was further informed by the visual nature of art education and the tendency among the participants to show things, such as student work, documents or institution facilities, rather than just talking about them.

The different approaches to data collection focused on different aspects of the research problem. The field work and site visits described above are mainly used for contextualization, while the other methods are discussed in greater detail in separate sections, starting with 1) a presentation of the interviews with art educators, followed by descriptions of the more experimental methods 2) the future workshops performed with students in teacher training, and 3) the video walks performed with art educators in different institutions or online sites.

3.1.1 Ethnographic expert interviews

Between 2015 and 2019, I performed interviews with 28 participants, active as art teacher educators, school art teachers or in in extracurricular art

schools/media centres: 12 in Sweden and 16 in Estonia. Most participants were interviewed only once, others up to three times. The interviews were typically about two hours long, but sometimes shorter and occasionally up to three hours. Most participants were interviewed individually with the exception of two Estonian participants who brought a colleague for language support, and two Swedish art educators who were interviewed together about a project they had performed as a group.[26] The interviews in Sweden were performed in Swedish, and the ones in Estonia were performed in English, except for one occasion when a translator was used.[27] One interview was performed via video link, and two via telephone.[28] When allowed by the participant (all except three interviews) the conversation was recorded using a sound recorder, and any material shown during the interview photographed with a digital pocket camera or smart phone.

The participating teacher from the compulsory school were all active in debating and developing visual arts education outside the classroom through, for example, participating actively in online communities, developing teaching materials or contributing to professional development in different context. The same applies to the teacher educators, where several were involved in other parts of the national and international art educational landscape, such as doing research, developing textbooks or national curricula for art subjects. Among the Estonian teacher educators, part time positions in the university was very common and many worked also as teachers in compulsory education or in extracurricular art schools. The multiple roles of the participants played an important part in getting access to different sites of negotiation.

Although having my professional background in visual arts education, I should not exaggerate my knowledge in these fields. Especially not in the case of Estonia where the first encounters with the participants were spent trying to figure out the quirks of the Estonian educational system, including past reforms and extracurricular activities. In other words, these meetings can be defined as *expert interviews*, often used in the exploratory phase of a research subject to get an overview of a certain field, and to get in contact with key actors in it (Bogner, Littig, & Menz, 2009, p. 2). Although some statements made during the interviews had the character of "hard facts", such as when new curricula were decided or how the teacher training is

—

[26] iE3; iE6; iS10; iS11

[27] iE13

[28] iS9; iS1; iS12

organized, expert knowledge is not used in this dissertation to create an objective historical overview but to understand the participants' understanding and use of the past and the present. Based on a constructivist understanding of knowledge and knowledge production, expert knowledge is understood rather as an "analytical construction" that becomes important due to the position of the expert, which allows her/him to put their interpretations into practice:

> The expert should be seen as a person who disposes of, or is believed to dispose of, particular competences, and who consequently has a social status, or exercises a function, which places him/her in a position where she or he may be able to gain general acceptance for his or her action orientations and situation definitions. (Bogner & Menz, 2009, p. 72)

This means that also in Sweden, where I had a better understanding of the educational system, the contextual knowledge of the participants was still very important in order to understand how their imaginaries of the subject are shaping the current organization of education. This definition of experts also guided the selection of informants, who either had a long experience of working as a teacher educator or teacher and could provide an account of the perceived changes in the field, or who held a position that allowed the shaping of how the subject is perceived and practiced in schools. In most cases these criteria coincided.

While positioning the participants as experts, the interviews as such had an ethnographic character. Depending on where the participant was located, their occupation and experiences, questions on the same topic were formulated differently and some questions were asked of only one or a few participants, either planned in advance or as follow up questions. The questions were typically "non-directive", posed to encourage the participant to talk about a certain area rather than providing specific information (Hammersley & Atkinson, 2007, pp. 117–118). This does not mean that the interview situations lacked structure. Unlike the common distinction between structured, semi-structured and unstructured interviews, I draw on the terms suggested by Hammersley and Atkinson, namely *prestructured* and *reflexive* interviewing, where ethnographic interviewing is always reflexive at the same time as it must be structured by the research agenda:

> Ethnographers do not usually decide beforehand the exact questions they want to ask, and do not ask each interviewee precisely the same questions, though they will usually enter the interviews with a list of issues to be co-

> vered. Nor do they seek to establish a fixed sequence in which relevant topics are covered; they adopt a more flexible approach, allowing the discussion to flow in a way that seems natural. (Hammersley & Atkinson, 2007, p. 117)

The structure and analytic focus were maintained by using an interview guide with three major themes or parts: past/perceived national traditions in visual arts education; the relation between visual arts education and media technologies; and the future of visual arts education.[29] Under these themes, a set of questions was prepared for each interview, many of them the same for each occasion, but also including some specific questions depending on the position of the participant. The themes and questions draw on the framework for *infrastructural inversion* in the study of classifications systems developed by Bowker and Star (1999, pp. 37–50), where they point out the need to look at both discourse and practice to understand the relation between infrastructure, culture and society. Although classifications and standards are not the main themes of this dissertation, I find their approach helpful in facilitating discussions with the participants where taken for granted and mundane knowledge becomes visible.

1) The interviews began with a theme that can be referred to as "the past of visual arts education" where the participants were asked to tell me about their background in the field, followed by more specific questions such as what changes have taken place during their career, and in the case of Estonia, how Soviet art education differed from the one developed after independence. This set of questions departs from a non-linear understanding of the past and of memories as constructed in the light of present believes (Bowker & Star, 1999, p. 40), and aimed to map shared understandings about the development of the subject and how they are used in discussion about the present and the future.

2) The second set of questions regarded working practice, how the participants relate to, use and negotiate the material conditions of their profession. By questioning "every apparent natural easiness" (Bowker & Star, 1999, p. 39) involved in visual arts education, the questions aimed to make the participants consider the work involved in the emergence and maintenance of infrastructures. Depending on the kind of work the participant was involved in, the material conditions discussed included traditional art making mediums, media technologies for art making, administrative tools and systems, communication systems, architecture and interior fittings.

—

[29] See appendix 1.

Discussing how individuals relate to different systems, technologies and traditions is also a way of understanding how knowledge about infrastructures is "learned as a part membership" in professional communities (Star & Ruhleder, 1996, p. 113).

3) The last part of the interviews was future oriented, and the participants were asked about what kinds of knowledge or approach they believed visual arts education can provide for future citizens, and how they thought that visual arts education would develop over the next ten or twenty years. As in the case of talking about the past, future imaginaries are used here as a way to make visible present "negotiations in action" (Bowker & Star, 1999, p. 45). Both the desired future visions and the more dystopian scenarios included discussions about which traditions to keep and which to exclude, that reflected ongoing tensions and conflicts within the subject.

While this was the structure provided by me as a researcher, ethnographic interviews are also to large degree structured by the participants (Hammersley & Atkinson, 2007, p. 117). This means that all themes were discussed in all interviews, but not in equal depth, depending on the interests and experiences of the participants. Where experienced teacher educators were able to give detailed accounts of long-term development, practicing teachers often had more recent experience of material conditions, and those involved in policy work had a lot to say about conflicts and negotiations taking place. To further target the topic of infrastructures, these reflexive interviews were supplemented with two more interventionist approaches: drawing workshops, focused on the nexus infrastructure/future/present, and video walks, concerned with the nexus infrastructure/past/present.

3.1.2 Future workshops

The drawing workshops were conducted with student teachers in the same university institutions where most of the interviews where performed, two at each university, all during 2017.[30] Each workshop lasted around two hours and consisted of 2-6 student participants and me as a researcher. The workshops were documented with an audio recording device and a digital still camera, as well as through the participant created material from each session. The theme of the workshops was "the art classroom of tomorrow", carried out as a collaborative activity where the participants made a map

[30] Except Tallinn Art Academy who have a joint programme with TLU and share the same students.

together of their ideal future art classroom, both as a physical and a virtual space.[31]

The structure of workshops builds on the model of *future workshops*, developed by Robert Jungk and Norbert Mullert (1987) as an attempt to encourage citizens to take part in in decision-making processes. While the method is originally intended as a tool for civic dialogue and participation rather than as a research approach, it has been previously used in media and communication studies as well as in more design oriented research fields, such as that of participatory design (e.g. Jensen, 2013; Kensing & Madsen, 1992), and even to engage teachers in the development and implementation of educational technology (Dirckinck-Holmfeld et al., 2019). With an emphasis on future imaginaries and how they relate to infrastructures such as physical sites, standards and systems, it also offers a suitable approach in this study, not least with regards to the sub questions under RQ2, on how art educators understand the enabling qualities of media in relation to their subject, and how they imagine the future of visual arts education.

A future workshop is usually conducted in five phases; preparation phase; critique phase; fantasy phase; implementation phase; and follow-up phase. The last two phases in this model are about developing concrete plans for implementing and following up the vision established in the third step and have been excluded from the research design here, since it is beyond the scope of this dissertation. Each workshop thus included three distinct phases, described below:

1) The *preparation phase* already begins before the actual workshop, with planning and finding participants. The workshops were conducted within the same institutions as many of the expert interviews, and all workshops except one were performed outside the general classes, with volunteer students.[32] To show that I appreciated their attendance and participation, effort was put in to make the room feel as inviting as possible. The table and chairs were rearranged into smaller stations; one for discussion, one where the material needed for the workshops was presented and one table with food, drink and snacks for the participants (fig. 2). Jungk and Mullert (1987, pp. 50, 71) emphasize the importance of such preparations in order to create an atmosphere of informality and to get discussions going. Setting up

—

[31] See appendix 2–4 for workshop invitation, workshop guide and the finished maps from each session.

[32] One of the workshops was performed as part of a mandatory course, but the class was then divided into two groups in separate rooms where the students could choose to either be part of the research project or to just participate in the workshop as part of the course, together with the course teacher in another room.

the room was also a way of framing the workshop as an event or ritual, where something special and important was going to happen, as well as managing my own emotions and trying to feel at home and in control of the situation.[33]

Figure 2. Workshop preparations: snacks and drawing material. Photographs from workshops.

The second part of the preparation phase lied within the actual workshop and consisted of an introduction where I presented myself, the project and how the material was going to be used, as well as some practical details about the structure and duration of the workshop. Then, the participants introduced themselves and their interest in the project. This was followed by a discussion about terminology, whereby we tried to agree on a common understanding of media that also included software, platforms, obsolete technologies and soft infrastructure, like curricula and grading.

2) The following *critique phase* is meant to gather experiences from participants that can then be built on to imagine new solutions to identified problems. This is grounded in a dynamic between the familiar and the unfamiliar, where the originators of the future workshop model suggest that by starting in the familiar, we can make the unfamiliar appear:

> To get taciturn people to talk about the future, first you must talk about the way they relate to the past and the present. Memories and past experiences often provide a springboard into the unknown. (Jungk & Mullert, 1987, p. 27)

In this case, the familiar is experiences from teaching and being taught art and the unfamiliar concealed or opaque infrastructures, as well as the future of education. In order to end up in a discussion where imaginaries of the latter could appear, the students were asked to map their current experience

[33] See Forsler (2018a) for a more detailed account on the emotional and practical aspects of setting up the workshops.

of media technologies in visual arts education. The material recourses in this phase were limited to white and coloured paper, felt tip pens and scissors (see fig. 2). To make the task even more concrete and structured, they were asked to first draw all the media technologies in the room we were located in; second, to draw all the media technologies they had encountered throughout their teacher training; and third, to draw the media technologies they had met or used during their school practice period, including both visible in-class technologies such as a LED projector or a printing press, and "invisible" technologies such as internet access. This mapping was facilitated by means of discussions in the group, helping the participants to remember and to agree among each other who should draw what. I also participated in the discussion as an "active facilitator" and encouraged the discussion with questions and suggestions (Jungk & Mullert, 1987, p. 65). The images produced by the participants were then cut out and placed on a large board.

3) In the last *fantasy phase,* the students were asked to use the images from the mapping, and to make new ones, to create their desired future art classroom on the board (see fig. 3). The classroom should facilitate the kind of visual arts education they assumed would be needed in the future and thus visualize social imaginaries about the subject itself, and its role in society. The participants were encouraged to discuss among each other what to include, what to get rid of and what to add, and to organize this into a common map that included both physical and virtual space. In this phase, they could also draw directly on the cardboard to indicate borders or movements within the classroom. "As ideas go up on the wall [or in this case the table], other ideas will be triggered off by association in quick succession and unexpected angles and connections will emerge" writes Jungk and Mullert (1987, p. 63). This point, that images or artefacts are a good way to facilitate discussion, is central in the literature on visual methods. Unlike oral statements, they remain in the room where they can be moved around, sorted and grouped which might lead to a nonlinear conversation and more elaborated reasoning (Fors & Bäckström, 2015, p. 124; Pink, 2013, pp. 95–96; Rose, 2012, pp. 311–314).

Figure 3. Discussions during fantasy phase. Photograph from workshop.

What is also important is that these images are created and selected by the participants, and not by me as a researcher, as is the case with, for example, photographic field notes. This again positions the participants as the experts, explaining the images to the researcher, instead of being presented with visual material to comment (Rose, 2012, p. 306). Making the images during the interview also takes time that the participants can use to elaborate on details and nuances in their stories (Gauntlett, 2007, pp. 125–126). Considering these points, drawing as a medium of expression has several advantages over, for example, photography: it is slower, it immediately results in tangible objects that can be moved around, and it often requires some explanation from the person behind the drawing. Helping the participants to cut out some of the drawings also helped me as a researcher to become part of the group and establish a sense of collaboration. Being asked to draw can, however, also create anxiety among participants, warns Gillian Rose (2012, p. 307), because it is considered harder than, for example, taking a photograph. In this case however, most participants had an educational background or interest in arts or crafts and did not express any hesitation towards drawing.

3.1.3 Walking with video

To facilitate more specific discussions on media technologies and infrastructures also with the participating teachers and teacher educators, I used a method Sarah Pink (2007) calls *walking with video*.[34] This approach was added to the methodological package after a pilot visit to a university where, after performing some interviews, I was offered a tour of the department, including lecture rooms, workshops, editing spaces and utility rooms. Back home the photographs from the department tour proved to be the most interesting part of the material, while the recorded interviews appeared weak and lacking direction. One image that I found particularly interesting shows a small room for digital video editing, bordered with discarded devises such as VHS-players, analogue cutting tables and video tapes. This physical layering of technology seemed to suggest that asking art teachers about how they related to media technology would be bringing owls to Athens. In front of me was a proper archive of obsolete technology, ready to be explored.

A discovery of something of research value in an otherwise unsuccessful search is what Siegfried Zielinski (2006) call a *fortuitous find*. To be open for such possibilities, he claims should not be confused with "aimless wandering and meandering" (p. 28) but is a central disposition for performing *media archaeology*, an approach that just like Kittler builds on Foucault's archaeological method for digging out the conditions of knowledge, but replaces his emphasis on discourse and narratives with a focus on material objects and their use (Parikka, 2012, p. 6). The archaeological impulse in this project, evoked by the image of the editing room, led to a partly new research focus aiming to map how art educators manage physical and virtual learning spaces by repurposing old media technologies or making up for inadequate infrastructures, formulated in research question two as *how they enable media*. In the follow up visits I then asked the participants to explore the facilities together with me in a walk around the department. These common excavations were videotaped by me to capture both the visual/material aspects of the walk and the discussions surrounding it.

The video walks also follow Parks' critical methodology for the study of infrastructures, where she promotes physical investigations as a way of "breaking infrastructures down into discrete parts and framing them as objects of curiosity" (Parks, 2015a, p. 356). In other words, using video to focus everything from sinks and shelves to images folders on the computer

—

[34] Henceforth referred to as *video walks*.

became a way to create a shared understanding between me and the participants of what the research project was about, and that taken for granted or seemingly mundane practices and topics are of relevance for this work. Being able to interact physically with objects further invites discussions about relationality, such as the workarounds conducted to make incongruent systems work, or how people can function as a central part of infrastructure.

In total, eight video walks were conducted, five in Estonia, and three in Sweden, each between 10 and 15 minutes long. Five of these concentrated on institutional spaces for art teaching or teacher training and two on online spaces for collaboration and communication. In the tour of the online places, the teachers used a laptop to explore sites where art teachers meet online, showing me how they work and move around in those spaces. Pink (2007, p. 250, 2013, p. 19) contrasts this approach to the use of film in early anthropology where the camera was typically still and seen as an "objective recording method", while films directed by the participant in movement invite an understanding of knowledge as embodied and situated.

Exploring social media in situ, together with the participants, was also a way to manage some of the difficulties involved in online media ethnography addressed by Bengtsson (2014), where the possibility to access a field from one's home environment "means having to adjust to two different everyday rhythms at the same time, something that may impair your ability to immerse yourself in the new culture sufficiently" (p. 875). In other words, it offered another kind of presence and concentration than possible in the everyday scanning of media related topics in social media communities, typically performed after office hours and mixed with private activities. The institutional walks in turn draw on Jon Prossner's (2007) framework for studying the "visible but hidden curriculum" of schools, where he proposed a mixed methodology of participant created material and visual documenttation, as well as focusing on different aspects of the material configurations of schools, including non-teaching spaces and educational material. In this case, it meant that the walks were not restricted to lecture rooms and other official spaces, but on my request also included utility rooms and in-between spaces, used for storing old student work, obsolete technology and other discarded objects.

3.2 Analytical approaches

The mixed methodology for data collection resulted in a broad and diverse material, consisting of audio files, written field notes, videos, photographs, documents, screen shots and hand drawn maps. As Pink (2013, pp. 142–146) points out, different kinds of material also represent different forms of knowledge and call for different interpretational approaches. Moving between sites and forms of knowledge means exploring the same field in diverse ways, rather than comparing standardized sets of data. It is further difficult to draw a strict line between the fieldwork and the analysis, seeing that many of the more experimental approaches emerged from a preliminary analysis of the ongoing fieldwork. As is often the case with qualitative research, the theoretical framework and research questions in this dissertation developed in parallel with the collection and analysis of data in an *iterative* research process (Hammersley & Atkinson, 2007, p. 159; Jensen, 2013, p. 236).

In the present study, this means that at the same time as the theoretical readings helped me develop a set of methods for data collection and a revised interview guide, the fieldwork and interpretation of data addressed the need for further readings and re-readings. The process through which these decisions were made is discussed here in three sections, starting with 1) a more overarching and theoretical discussion of the analytical approaches used in this dissertation, followed by a more concrete description of 2) how the material was organized and interpreted, including a reflection on the use of visual and participant created material, 3) and some reflections about the historicizing perspective.

3.2.1 Noticing mundanity *and* difference

The mundanity and taken-for-grantedness of infrastructures is not only a question of invisibility but also of *ubiquity*. This poses yet another methodological challenge, that at first sight seems overwhelming – how to study something that is saturated into every aspect of our lived environments? For Bowker and Star (1999), one "trick of the trade" in bringing about infrastructural inversion is to "step back from this complexity and think about the issue of ubiquity rather than trying to trace the myriad connections in any one case" (p. 38). The way different systems and standards are entangled and layered makes them hard to separate, and each aspect *can* prove to be important for the analysis. A similar idea is put forth by Becker (1998, 2008) who argues that in order to know what is important in a certain

situation, the researcher should turn to the *specific* features of that environment. These local circumstances, he continues, make up the "environing conditions" under which social relations and processes exist and should therefore guide the analysis:

> We accumulate knowledge by finding more and more things that, in this sense, can't be left out, things that are, in the first instance, tied to the local circumstances of the cases we study. So, rather than trying to ignore or "control" local variation, we should find these local peculiarities and build them into our results. (Becker, 1998, pp. 81–82)

To look for connections as they appear in the empirical material rather than assuming a certain perspective where some things or structures are beforehand seen as more important than others, resembles the "flat ontology" advocated by Bruno Latour (2005) and other STS scholars, often used as a way to address the agency of non-human things. As Rita Felski (2016) has argued, a more open and tentative examination of how artefacts, environments, people and discourses are connected can provide an exciting supplement to the critical perspectives dominating humanities research in recent decades. In this way, Latour share with infrastructuralism a penchant for the mundane and the routinized, in contrast to post-structural and feminist approaches that tend to look at anomalies and gaps as a way to understand how the world is constructed through binaries and language.

Felski (2016), noting how Latour "has become increasingly impatient with the rhetoric of social construction and the technique of distancing oneself from texts, attitudes, or persons in order to 'trouble' or 'problematize' their assumptions" (p. 749) sees potential for this kind of research, especially in comparative studies. She suggests that comparation can be seen as a kind of "relational thinking" that is "initiating a humbling sense of the limits of one's own perspective", not least by engaging with the comparisons made by participants themselves and by comparing not only in space but also in time (Felski, 2016, p. 754; see also Becker, 1998, pp. 205–206). This broader take on comparative research has informed the historicizing perspective used in this dissertation, discussed in detail further on in this chapter. Another legacy from Latour in this study is the focus on describing the relations between educators, technologies and environments rather than on understanding individual people and their motivations.

At the same time, I agree with the critique against object-oriented approaches as being too descriptive and not paying enough attention to rela-

tions of power (e.g. Couldry, 2008; Parks & Starosielski, 2015, p. 10; Peters, 2015b, p. 30). All things and relations are not equally important, and what is important is not only decided by the participants and the material but also by the theoretical perspectives and by me as a researcher. The turn towards ontology represented by Latour is also present in the German school of media theory, where media is understood broadly as *modes of being*. For Parks and Starosielski (see also Parks, 2019b; 2015, p. 10), such a conceptualization of media would mean overlooking feminist and poststructuralist contributions to the field of media and infrastructure studies, and an unfortunate disregard for the specificities of media in different local contexts. Or as put by Peters (2015b): "Ontology is not flat; it is wrinkly, cloudy, and bunched" (p. 30).

For this study, it means that while schools are understood as media environments constituting certain modes of being, thinking and acting, these environments and the relations taking place within them are likely to differ depending on the local context. These differences, or how they are played out are, however, not taken for granted beforehand but traced in the material. More concretely, the comparative aspect of the study did not only depart from predefined categories such as nationality but looked for differences as they appeared in the material, not only *between* nation states but also *within* and *across* them. To look for difference to understand mundanity might seem far-fetched, but it can provide a fruitful approach to understanding the relationship between standardized technology and local experience, as explained by Donna Haraway in her reading of Star:

> In Star's account, we are all members of many communities of practice. Multiplicity is in play with questions of standardization, and no one is standard or ill fitted in all communities of practice. Some kinds of more than others, but all forms work by producing those that do not fit as well as those who do. Inquiry about technoscience from the point of view of Star's monsters does not necessarily focus on those who do not fit, but rather on the contingent material-semiotic articulations that bring such ill-fitting positions into being and sustain them. (Haraway, 1997, p. 38)

This rethinking of difference beyond binary oppositions has been important in this study in order not to position visual arts education as "other" to the educational system in general or to look for conflict, but at the same time to recognize the specific position of the subject and allow contradictions and ambiguities to appear in the material. In other words, while the dissertation takes an interest in the mundane aspects of media, having informed the set

of methods for material collection, the thematic analysis of the material also draws on post-structural traditions in acknowledging ambiguities and diversity in the material. The practicalities of this process are described in the following section.

3.2.2 A thematic analysis of mixed materials

The material was analysed thematically, drawing on Ryan and Bernard's (2003) definition of themes as "conceptual linking of expressions that can be found in texts, images or objects" (p. 87-88). The initial sorting of the material was performed during the transcription phase of the audio recordings from the interviews and workshops, during which I identified recurring themes in the material and decided what parts to transcribe word by word and which to summarize. The preliminary categories emerging from this process were then also used to go through and sort the textual and visual field notes. This initial sorting of the material was continuously supplemented with regular re-views and re-listenings throughout the analytical process, resulting in new or altered categories and word by word transcriptions of other parts of the material.[35]

The audio from the workshops was transcribed and analysed in a parallel process of looking at the photographs taken during the session and the final map from each workshop. As often pointed out in relation to visual and creative methods, it is the "participant explanations, in concert with the images" that make up the primary data in studies involving participant-generated content (Guillemin & Drew, 2010, p. 183). The material produced by the participants during a research workshop can, in other words not be separated from the act of making it, nor be interpreted by the researcher outside this context (Gauntlett & Holzwarth, 2006; Rose, 2012, p. 315; Siibak, Forsman, & Hernwall, 2014). The context dependence of participant-created material further means that the visual material from the workshops was not approached through semiotic methods or interpreted in the strict sense of the word. For Sarah Pink (2013, p. 17), it is this refusal to treat images as texts to be "read", that distinguishes visual methods from other research perspectives on visual culture. Instead, she draws on the work of Tim Ingold to suggest an approach of thinking about images as

—

[35] Material that was not created as part of this dissertation, such as educational material or online discussions, has a more diverse character and was not fully mapped, but rather scrutinized for themes that emerged in the other material, or from the theoretical framework.

made *in* the world rather than as finalised representations *of* the world (Pink, 2013, p. 40).

The visual material that has been most important for the analysis in this dissertation are the classroom maps created by student teachers during the workshops. From the perspective of images as context dependent, maps can be defined as either "a view *in* the world, as it appears from a particular place or a view *of* the world filtered through the schemata of a received cultural tradition" (Ingold, 2002, p. 225). But maps are not only produced in the world, they also take part in constructing it by "giving guidance for future actions" (Bolin, 2006, p. 71). This make maps a useful form through which to facilitate discussions about the future, as emerging from an imagined and materialized past (here represented by the art classroom). Ingold (2002, p. 234) further distinguishes between *wayfinding*, as the experience based knowledge of a certain environment, *mapping*, as the narrative re-enactment of moving around and interacting with this environment, and *map-making*, where the "environmentally situated movement" involved in both wayfinding and mapping is bracketed out. What the participants in the future workshops were asked to do was, in other words, to narrate, or "map", their knowledge about a certain environment, while also making a visual representation of this narrative using established cultural symbols and conventions. Interpreting the outcome of this map-making without taking the "mapping" into account would then be at the expense of the situated knowledge expressed in the workshops.

Another aspect to take into account when it comes to the production of participant generated material is what resources are made available. From the perspective of media as inseparable from epistemology, the technologies used to create representations also conditions what can be said. This is discussed by Skåreus (2007, p. 88) in her study of how student art teachers represent themselves in their future profession through digital collages. In that case, the use of computers and imaging software made possible what Lev Manovich (1999) identifies as a *database form*, the reuse and combination of separate elements without any fixed narrative, that in turn prioritized self-representations of the teacher as immersed in visual culture through references to popular media images and genres. In this study, the material at hand – paper, pens, scissors and glue – along with established conventions about maps as a genre, prioritized other kinds of expressions that had more to do with structure and orientation than with identity or content.

The emphasis of the participants "voice" in visual methods can be summed up by the notion that they "as producers of the image are the most

relevant and appropriate people to give meaning to the image they have generated" (Guillemin & Drew, 2010, p. 184). This should, however, not be understood as a diminishing of the researcher into someone who is "just recording what people say" but rather that I as a researcher "need to listen to what is said overall and then come back in at the end and develop conclusions and theory, based on an overview of everything that has been created and recorded" (Gauntlett & Holzwarth, 2006, p. 87). This means that the descriptions of the participant created images as they appear in this dissertation follow the meaning given to them by the participants, while the overall analysis of the material is informed by the theoretical framework and might contradict or challenge these meanings.

3.2.3 The historicizing perspective

In visual arts education, learning about the history of the subject is an important part of teacher training in universities, shaping course design, teaching material and discourse. Such memories and narratives make up soft infrastructures that are central to how visual arts education is perceived and practiced today. As Jasanoff has shown, this dialectic between past and present also includes imaginaries about the future:

> Past and future connect in a complex dialectic that is widely acknowledged. The past is a prologue, but it is also a site of memory excavated and reinterpreted in the light of a society's understanding of the present and its hopes for what lies ahead. (Jasanoff, 2015a, p. 21)

The notion that the future is also part of the past points to a non-linear understanding of history, described here as a *historicizing perspective*. In this approach, the past is explored as a "site of memory", embedded in institutions, discourses and artefacts (Bowker et al., 2009, p. 97; Bowker & Star, 1999, pp. 40–42). It comes across in the fieldwork and analysis as a sensibility to how established infrastructures, both discursive and material, shape the implementation and development of new media technologies.

As previously discussed, the interviews performed with art educators include a section about their visions of past traditions within the subject. Similar to how Kaun (2012) discusses the past with participants in her dissertation about civic experiences to understand "what sites of negotiation they identify in the context of Estonian historical narratives" (p. 139), this is an attempt to make visible taken-for-granted and shared imaginaries about the past and their importance for the present and the future, rather than

accessing actual historical development. Regardless of whether past traditions are perceived as something to build on or to deprecate, they are narrated as some kind of development leading up to the present way of organizing and thinking about visual arts education. Different institutions often have distinct narratives and ways of ordering the past that are shared by those working or studying there. Discussing perceived changes and the past in the interviews is thus aimed at creating an understanding of local institutional memory as a kind of infrastructure.

A similar approach was taken during the video walks and site visits, but with an emphasis on how the past is materialized and layered within the educational institutions. Drawing on archaeological approaches to media (e.g. Mattern, 2015, 2017; Parikka, 2012; Zielinski, 2006), art classrooms – that tend to store media technologies and materials from the past – are conceptualized here *as archives of past subject traditions*, curated and excavated by teachers. Situated within institutional buildings, these archives can further be explored for educational imaginaries in the architecture and interior fittings (Kirkeby, 2006; Rahm, 2019). As shown by Staffan Ericson and Kristina Riegert (2010), the history of media is deeply intertwined with that of buildings, and in old media still resides in institutional buildings, not as disused artefacts but as active elements of shaping the present. This means that an institution built as an art schools might be preconditioned for a certain medium (for example painting, demanding big windows to get as much daylight as possible) whereas newer media demands different infrastructural pre-conditions, such the possibility to darken a room. In other cases, the building was built for another purpose and must be altered to fit the specific conditions of visual arts education.

The ways in which educators use and negotiate the past is mainly discussed in chapter five, but it has also informed the structure and content of chapter four. Following Felski's (2016) Latour inspired suggestion to organize comparisons based on the categories used by participants, this chapter maps the historical context of visual arts education in Sweden and Estonia, based on previous research but structured in accordance with the participants renderings of the past. This means that recurring themes or events have been given more attention than those considered less important by the participants (although their memories to a large extent aligned with those put forth in previous research), in order to capture the cultural specificities of that context. At the same time, chapter four differs from the more historicizing approaches in the analytical chapters by following a dominant narrative of linear historical development and a strict national

division. This difference is motivated by its function as both a background and a kind of material, describing a shared memory on which the present and the future is projected, made visible through national comparison.

3.3 Ethical and practical considerations

The analytical approach to visual material discussed above also has an ethical dimension. Although both researcher and participants are involved in the analytic process, it is the researcher who is responsible for the final product and the research participants need to be certain that their contribution is not taken out of context or misinterpreted. Let us return once more to the map on the cover of this book, and a dialogue which took part during this workshop. The fear of being misinterpreted, or even interpreted, came across when one of the participants pointed to the map they were working on and said, "now you will look at this and try to interpret where we are going". This statement was made while adding footsteps to their collaborative drawing to indicate the movement of the teacher in this space. After being assured that the material would not be interpreted but looked at together with the sound recordings, the participant was clearly relieved and replied, "good, because there is not really a thought behind the directions here".[36] What this dialogue shows is not only the dominance of semiotic approaches to images, but also how exposed the participants might feel in a research situation where they leave behind material without knowing how it is going to be understood or in what context it is going to be placed (Hammersley & Atkinson, 2007, p. 233). Although all participants were given information about the project before and in the beginning of each interview, workshop or video walk, the outcome of a research process is difficult to imagine beforehand.

The meta discussion on the purpose of the workshop and the use of the produced material also shows how the participant's understandings of the research projects shape the outcome and focus of experimental and interventions situations (Orne, 1962). This bias can also come across in more conventional research methods such as qualitative interviews (Kvale, 2007, p. 126), in this study often in the shape of "sailors' stories" on the successful implementation of digital technology in education (Selwyn, 2011b, p. 212). This focus on digital technology can in turn be related to my position as a media researcher. Although a shared professional background

—

[36] wsS3

can be valuable as a common frame of reference when re-entering a professional context as a researcher, this professional identity is also combined with expectations of the researcher as a scholar with certain perspectives and interests (Ståhlberg, 2006, p. 51).

Such professional identities further complicate the prior fixation between native and non-native research, that has been widely discussed within anthropology, stressing that national belonging is only one aspect of cultural identity, especially in times of migration and globalization (Narayan, 1993; Ståhlberg, 2006). In this case it meant that although sharing both national and professional background with the participants in Sweden, there are always differences and ambiguities within a field that I as a researcher are unfamiliar with. As argued by Kirin Narayan (1993), no one can be said to be truly "native" to a culture, and the point of research is precisely to find out what you do not know and try to capture the "strange and unexpected aspects of one's own society" (p. 679). At the same time, my professional background meant that I did share certain cultural dispositions and kinships with the research participants, which was indeed helpful in order to get access to the field and establish relations within it.

Two of my first encounters with participants became almost absurd due to our striking physical resemblance, resulting in laughter and small talk about clothes, and on several other occasions, participants who first declined participation via email, agreed to talk to me after we had met in person, "because you don't look scary" as one of them explained.[37] Visual arts education is a field internationally dominated by women, certainly "on the ground" but also within research, teacher training and policy development. Of the 28 interviewed experts, only five were men, and out of the 42 students participating in the workshops, only one. Most participants have a background in art or design and an interest in cultural activities. As a female, middle-aged, white researcher with a love for striped shirts and a decent knowledge about the contemporary art scene, I blended in very well in this gender-typed context. Of course, this feeling of kinship is mutual, and it must be spelled out that the critical perspective in this dissertation is aimed at acknowledging tensions and conflicts in the field, never towards the participants or their stories.

On a more instrumental level, ethical concerns also include questions about anonymity and permission to use the material. Prior to all interviews, workshops, video walks and site visits the participants were not only en-

—

[37] iE1

sured anonymity, but also given information about the project, how the material was going to be used and told that it was possible to withdraw their participation at any time. Basic schools, art schools and webpages were also anonymized, but the participating universities were named. The reason for this is that art teacher training is such a small discipline, given only in a few universities, that it would be nearly impossible to maintain anonymity if the participating nations were named (which was necessary for the comparative perspective). Such consideration shows how anonymity in qualitative research can be described as a continuum "along which researchers balance two competing priorities: maximising protection of participants' identities and maintaining the value and integrity of the data" (Saunders, Kitzinger, & Kitzinger, 2015, p. 617). While a total removal of identifying factors such as nationality and mode of data collection would have meant a higher degree of anonymization for the participants, it would simultaneously have had consequences for what could be done with the data in the analysis and the possibilities for a reader to understand how the material has been collected and used.[38]

While most qualitative research uses pseudonyms to anonymize participants, I chose a system of alphanumeric coding. Although recognizing the criticism that such a system might seem distancing or impersonal (c.f. Allen & Wiles, 2016, p. 154; Saunders et al., 2015, p. 621), the use of pseudonyms is also a complicated matter that involves a dimension of interpretation and can be a sensitive issue for the participants (Allen & Wiles, 2016; Corden & Sainsbury, 2006, p. 105). The use of pseudonyms is further associated with a more traditional kind of ethnographic research that has a narrative character and that focuses on the experiences and life stories of individual people rather than on the activities they are engaged in (Becker, 1998, p. 66; Hammersley & Atkinson, 2007, pp. 198–200). Another motive for using an alphanumeric coding system is that it is more manageable than pseudonyms when accounting for recurring statements in the material.[39] The choice not to anonymize the partaking institutions further means that

—

[38] Generalizing statements into national categories is not a good idea either. Not only is it problematic from a transparency perspective, but it would also obscure differences within each community, which would be disrespectful to the participants who would then have their individual statements attributed to a larger group, and conversely, become associated with ideas that they might disagree on.

[39] Quotes from the interviews, workshop or video walks, including single words, are never summarized but referenced according to the alphanumeric system out of respect for the participants' individual voices, although this means a rather extensive footnote system.

someone with insight into the field of visual arts education might be able to recognize informants based on their position or background (Nespor, 2000; Tolich, 2004; Walford, 2005). To minimize the risk of this happening, the numbering of the interviewees and workshops is only connected to nationality and does not reveal the institution where it was recorded, or the position of the participant within that institution.[40]

The data from the online communities is collected and processed in accordance with the ethical guidelines developed by the Association of Internet Researchers (2020). While it is "manifestly impracticable" to receive informed consent from all members of a social media community, the demands on the researcher to ensure anonymization and avoid misinterpretation is even higher than with methods where informed consent is used (p. 10). In addition, digital traces such as blog posts or discussion threads in online fora must be treated differently than contextualized statements made in, say, an interview situation. In this case it means that no social media groups are named and that dates, longer quotes or single occurrences of statements that might be used to identify individuals, are avoided. When quotes from online discussions are reproduced verbatim, informed consent was obtained for this specific publication. In line with the dialogic approach recommended by AoIR (2020, pp. 69–71), in order to make sure participants do not feel misinterpreted when online data is taken out of context, they were also asked to approve the translation of these quotes into English.

Language is also an issue when it comes to the interviews, workshops and video walks. In Estonia, neither I nor any of the participants have English as our mother tongue, and it must be assumed that nuances got lost in translation (Fersch, 2013; Temple & Young, 2004). The same applies for the Swedish interviews, that were translated into English by me, in a process of "re-constructing" the original meaning as understood from my horizon (Temple, Edwards, & Alexander, 2006). While the analysis is not concentrated on discourse, the language issue can be considered less problematic but with respect to the participants I have tried to stay as close to their expressions as possible. The quotes from the Estonian material is reproduced verbatim, with the exception of grammatical errors that have been removed in order not to take attention from what is being said. In chapter

—

[40] In some cases, such details might be revealed by the context in the analysis, but only when it was considered necessary background information, and when the categories are broad enough to avoid identification of an individual. Information that might harm the participants, such as gossip or statements about individuals, has been excluded from the presented material but is present in the analysis given that it has shaped my understanding of tensions in the field.

four, the previous research used in the subchapter on Estonia is limited to reports written in English language, which might result in a lack of alternative voices and nuances in the material.

3.4 Summary

- Inspired by ethnographic research within critical infrastructure studies, this dissertation uses a mixed methods approach, combining field observations, online and offline site visits, semi-structured interviews, drawing workshops and video walks.
- The more interventionist elements of this methodological package (workshops and video walks) are included to make possible an *infrastructural inversion*, a foregrounding of hidden or taken-for-granted environments and relations.
- The empirical material was collected between 2015 and 2019 in different sites related to visual arts education in Sweden and Estonia. The material is anonymized through an alphanumeric coding system.
- The interviews were performed with teacher educators or teachers active in debating and developing visual arts education. They are conceptualized here as *expert interviews,* based on the position of the participants and their influence over the field.
- The drawing workshops were conducted with students in art teacher training, based on a model of *future workshops,* originally developed as a tool for civic participation but used here as a way to make visible future imaginaries.
- The *video walks* were performed with art teachers and teacher educators in university institutions, compulsory education classrooms and in online environments in order to make visible the invisible work performed in these places.
- The interview material and field notes are analysed thematically, while the visual and participant created material is analysed based on how it was presented by the participants, rather than through semiotic interpretation. The categories and comparations made by participants have also been used to organize the historical background in chapter four in accordance with their visions of the past.

CHAPTER 4

Visual arts education in context: Estonia and Sweden

This chapter provides a brief overview of the historical development of visual arts education in Sweden and Estonia and contextualizes it in relation to overarching structures such as the public-school system, processes of school digitalization and the organization of teacher training. It is based on previous research as well as on policy documents and governmental information. The aim of providing this broad, historical background is to introduce some of the core questions and debates in the field of visual arts education such as the status of visual arts education in relation to other school subjects, the role of technology within compulsory education and what it means to be a professional art teacher.

Due to the historical differences in politics and ways of organizing education, important debates and shifts occur on different times in Sweden and Estonia, involving different actors and institutions. In addition, some of these events are more strongly emphasized in contemporary debates than others and need to be fleshed out in order to understand the local differences in how visual art is discussed and practiced. For this reason, the chapter is structured thematically rather than temporally, and certain time periods and topics are given more attention in one of the national cases than in the other. One such example is the rather extensive discussion on teachers' professional autonomy in Estonia, which is necessary to understand the way the Estonian participants discuss curricula, but which is less key in the Swedish educational debate and therefore less prominent in the subchapter on Sweden. The abundance of extracurricular art schools in Estonia compared to Sweden is another example. The selection of what to focus on is thus informed, but not determined by, the empirical material.

4.1 Estonia: Setting the scene

Much Estonian visual arts education has taken place outside compulsory schools, in hobby classes and private art schools. One of the reasons for this is the emphasis on *polytechnical education* that is characteristic for the Soviet period. Combining manual training in industrial and agricultural techniques with technical know-how, this comprised one of the central pillars in Marxist educational philosophy (De Witt, 1961, pp. 78–79; Šapovalenko, 1963; Simon, 1954; Small, 1984). The emphasis on vocational training in compulsory school subjects led to a division between technical school art education and more fine arts oriented extracurricular activities.

The other main tension in Estonian visual arts education is that between the academic atelier tradition and contemporary art. These negotiations between Soviet traditions of industrial skill training, academic art and classical art history on one side, and the more recent tradition of contemporary art on the other are played out across curricula, teacher training and technology implementation. Other, more general educational debates in Estonia that have been brought up by participants during the fieldwork include how teachers relate to the curricula and the difference between Russian language and Estonian language schools.

The subchapter starts with 1) a discussion of the organization of compulsory education, with a certain emphasis on the Soviet period, and 2) an overview of school digitalization initiatives, focusing on the period after independence from the Soviet Union and the *Tiger Leap Project,* followed by 3) an introduction to traditions within visual arts education in compulsory school and hobby schools, and 4) a discussion of art teacher training in Tartu University, Tallinn University and the Estonian Academy of Arts.

4.1.1 The organization of compulsory education in Estonia

As historian Helmut Piirimäe (1997) has shown in his historical overview of the relation between Estonia and the Nordic countries, the strong links between Sweden and Estonia were established not least through the educational realm. Estonia became part of the Kingdom of Sweden in the late 16th century after Sweden supported Estonia in the defence against Russian invaders. During the same period, the Swedish educational landscape developed through the introduction of "gymnasiums" (approximately equivalent to grammars schools) that functioned like smaller, provincial universities. Among these were the Tartu Gymnasium that opened in 1630, followed by Tallinn Gymnasium in 1632, in close collaboration with grammars

schools and universities within the current borders of Sweden. Tartu Gymnasium also came to train teachers for the newly established network of peasant schools in the Estonian province.

The Swedish influence on the organization of education in Estonia meant that the first public school was based on political and pedagogical ideals from western Europe, such as the right to basic education regardless of social position, and educational approaches based on science and child development. Around the time of the establishment of the independent Republic of Estonia in 1918, this three-year rural school developed into a system of compulsory national education in Estonian language that included both primary and secondary schools (Erss, Kalmus, & Autio, 2016, pp. 590–591; Krull & Mikser, 2010; Põldma & Puur, 2014; Ruus, 2012a). The system was based on the German model of education, with a stratified secondary school and an emphasis on the pedagogical autonomy of the teacher (Erss et al., 2016, pp. 590–591).

When Estonia became part of the Soviet Union in 1940, the educational system was gradually incorporated into the Soviet system and by 1944 Estonia adopted the centralized Moscow curriculum with some local adaptions, such as the possibility to continue using Estonian language textbooks and to include elements of national culture (Krull & Mikser, 2010; Krull & Trasberg, 2006; Rõuk, Van Der Walt, & Wolhuter, 2017). At the same time, Russian speaking Soviet citizens were encouraged to immigrate to Estonia and by 1989, non-Estonian speakers made up almost 40 % of the total population, most of them Russian speaking. This resulted in two parallel school systems, one Russian language school system based on the centralized curriculum developed in Moscow, and one Estonian language school, using the adapted curriculum developed by the Estonian Ministry of Education[41] (Khavenson & Carnoy, 2016; Krull & Trasberg, 2006, p. 4; Rõuk et al., 2017, p. 115).[42]

The curricular design in both systems consisted of 1) a curriculum plan stating grades, subjects and hours, 2) a syllabus outlining the content of each subject and 3) textbooks for the pedagogical implementation of the content. The role of the teacher in this system was reduced to implementing this curricular package, through approved teaching methods and instructional materials (Chabe, 1969, p. 666; De Witt, 1961, p. 118). The teachers

—

[41] Subordinated to the Ministry of Education in Moscow.

[42] While general education based on national language was considered an exception in the Soviet Union, the Estonian school was one year longer, 11 instead of 10 years (from 1985, 12 and 11 years) to provide time for Estonian language courses without diminishing the mandatory content.

should also act as political stabilizers and socialize children in the proper communist spirit and ideology (Krull, 2007, p. 72; Tuul, Ugaste, & Mikser, 2011; Zajda, 1980, pp. 108–109). To account for keeping to the prescribed methods and ideological content, teachers had to keep a teaching diary of what they did in class (Tuul et al., 2011, p. 771).

The everyday mentality of Estonian educators during the Soviet regime have been described as a "hidden reluctance towards ideological education and toward the centralization of curricula" where teachers became used to including "ideological slogans of which the overwhelming majority of them really did not believe" in their teaching, in order to keep their positions (Krull & Trasberg, 2006, pp. 7, 3). Others suggest that these slogans, along with the detailed curricula packages, were reserved mainly for the lesson plan and teaching diary while the classroom activities were adapted to fit the needs and interests of the students (Pilve, 2014, p. 58; Varik, 2013, p. 196). In a study by Tuul, Ugaste and Mikser (2011) of Estonian teacher's perception of the Soviet curricula, the authors describe this approach as a "hidden curriculum", operating in parallel to the Soviet pedagogy:

> Many of the teachers said that they tried to work so that children's interests were considered more important than the exact fulfilment of the curriculum. They found that a really professional teacher was independent, and, despite the inflexible curriculum and strict inspections, tried to keep in mind that the dignity and ethical viewpoints of her occupation were paramount. Thus, in the shadow of the national curriculum there was an effort to implement their personal curricula, one in agreement with their own views and positions. (Tuul et al., 2011, p. 768).

After independence in 1991 the centralized and rigorous Soviet curriculum was replaced with more general frameworks where teachers, headmasters and local municipalities received greater possibilities, but also responsibilities, when it came to developing curricula and adjusting them to local conditions (Krull & Mikser, 2010; Lees, 2016; Tuul et al., 2011). However, according to a comparative study of teachers' perception of curricular autonomy in Estonia, Finland and Germany, this ambition of turning teachers into curriculum makers was never fully realized (Erss et al., 2016). The study showed that Estonian teachers, having their professional identities shaped in the centralized Soviet school system, were much more critical towards the national curriculum than the Finnish and German teachers, and only partially accepted it (despite allowing for more freedom).

Another study on the same topic suggest the opposite, that perhaps the "majority of teachers in the former Soviet republics are still used to following prescriptive curricula and curriculum developers are used to seeing teachers rather as *faithful implementers of an externally developed curriculum* and not as autonomous consumers and decision-makers" (Viirpalu, Krull, & Mikser, 2016, p. 66,). Both studies express a persisting tension between teachers and curriculum makers, based on past experiences of control and of limitations in professional autonomy. For Errs et al (2016), this tension is also an effect of how the curriculum is structured and implemented – in a top down manner with subject syllabuses "listing requirements for detailed encyclopaedic knowledge and leaving very little room for individualized approaches and teacher autonomy" (p. 593).

The tension between teachers and curricula makers and the partial disregard for the national curriculum is also visible in the continuation of the parallel system of Estonian language and Russian language schools. Although the educational reforms after 1991 emphasize the role of Estonian language in education and of a unified pedagogical approach, Russian schools did not have to follow the new curriculum until in 2007, and after that only partially. Compared to the other Baltic states, Estonia chose what Khavenson and Carnoy (2016, p. 181) describe as a "laissez-faire attitude" towards Russian schools that have not only continued to teach in Russian, but also to a large extent kept syllabuses and textbooks from the Soviet era. This separation is further reinforced by geographical conditions, where the majority of the Russian schools in Estonia are concentrated in the eastern part of the country, bordering Russia. From around 2015, the Estonian state has put more effort into making Russian language schools adopt Estonian curricula and teaching methods through investments such as offering professional development for Russian teachers and producing Estonian textbooks in Russian (Khavenson & Carnoy, 2016; Krull & Trasberg, 2006).

The ten-year period following independence in 1991 was a turbulent one for the Estonian education system, with rapid and dramatic changes in policies and curricula (Krull & Trasberg, 2006). According to Khavenson and Carnoy (2016, p. 180), most of these educational reforms were focused on defining national identity (with a certain emphasis on the Estonian language) and on meeting the political conditions for joining the EU. Erss, Kalmus and Auto (2016) further show how the contemporary Estonian school system is heavily influenced by neoliberal ideology "with an emphasis on competition, accountability and business-like managements concepts" (p. 605). In line with both these characteristics are the extensive in-

vestments in computerization of schools that have been undertaken in Estonia since the 1990s, making possible comparisons and large-scale control systems, at the same time contributing to the national image of Estonia as a "tech-savvy" inventor society.

4.1.2 School digitalization in Estonia

In the official success story of Estonia's post-communist transformation, the country "has successfully transformed itself from an underdeveloped, post-Soviet transition state into e-Estonia, an advanced digital society" (Mäe, 2017, p. 33). Investments and innovations in digital technology are an important part of this narrative, aimed primarily at an audience outside Estonia. As pointed out by Marju Lauristin (1997, p. 25) the very idea of Estonia as a state in *transition* implies a retrospective and external viewpoint, where the path of development is known and always points to the west. This perspective dominates, not least when it comes to technological development, as noted by other Estonian media researchers stating that "ICT-related change – like other areas of transformation – has been dealt with primarily at the macro level and has often been interpreted from the perspective of eastern Europe 'catching up' with the West" (Runnel et al., 2009, p. 30).[43]

The computerization of the educational system is one of the key elements in this ongoing project to "'re-brand' the nation in the eyes of the Western world" (Bolin, 2006, p. 83). The *Tiger Leap Project*[44] was launched in 1997 in order to improve the access and use of computers and internet in schools. With the aim of preparing future "digital" citizens as well as fostering entrepreneurship and innovation, Tiger Leap Project can be understood as "a metaphor for the success story of rapid reformations"

—

[43] What is missing from this narrative, according to Baltic researchers, is a historical perspective that stretches beyond the Soviet period and takes into account the periods before the second world war. Estonian cultural theorist Epp Annus (2012, p. 26) argues that Estonians, due to their history of well-developed public education and high literacy, felt superior to the Russians throughout the Soviet period and that Estonians have always considered themselves a part of Western Europe. From this perspective, the ostensible "westernization" of the Baltic states is actually a *re-westernization* where "the wish to be accepted again by the West and to be recognized as an integral part of the Western cultural realm is a more substantial driving force in the development than mere economic or political motivation will ever be" (Lauristin, 1997, p. 29).

[44] The English translation of *Tiigrihüpe* varies in the literature, and includes *Tiger Leap Initiative*, *Tiger Leap Project*, and *Tiger Leap Program*. I have chosen to use the translation *Tiger Leap Project* when referring to the overall project and *Tiger Leap Program* to refer to the first implementation phase 1997–2000.

(Runnel et al., 2009, p. 33). The project was funded by state and municipal budget and managed by the newly founded Tiger Leap Foundation. In addition to providing schools with computers and internet access, the project also offered ICT courses for teachers (Charles, 2009, p. 102; Karaseva et al., 2013; Mäe, 2017, p. 33; Opermann, 2014, p. 27; Runnel et al., 2009; Toots & Laanpere, 2005).

In 2000, the initial three-year programme was evaluated in a national survey called *Tiger in focus*, showing that although the implementation of computers in schools had been very successful, there were still "remarkable differences" in the use of ICT between different regions in Estonia as well as between boys and girls (Toots & Laanpere, 2005, p. 16). The regional differences were not so much between urban and rural parts of the country, as between Russian and Estonian speaking regions. The survey showed a slightly lower use of ICT in Russian schools, but more importantly, a limited access to computer labs after school hours, explained by the researchers behind the survey to be partly about Russian pedagogical traditions that are often based on oral presentations and tests rather than on written essays where information search is more central. Runnel, Pruulmann-Vengerfeldt, & Reinsalu (2009, p. 35) further argues that the programme was carried out in a top-down manner, viewing teachers and students as passive recipients rather than fostering critical engagement.

In order to improve the ICT competences among students, teachers and educational staff, in 2000–2005 the *Tiger Leap Program* was followed up by *Tiger Leap Plus*, focusing on computer training and the development of ICT infrastructure for communication and cooperation between teachers, such as an online portal call *School life*[45] where teachers can collaborate, share ideas and material (#HITSA, 2015; Toots & Laanpere, 2005, p. 8). This programme was then followed by *Learning Tiger*,[46] a range of resources and online courses for teachers in different subjects with a certain emphasis on programming, running from 2006 to 2012.[47] In 2013, the *Information Technology Foundation for Education* (HITSA) was founded, as a successor to the Tiger Leap Foundation with the aim of continuing the development of digital infrastructures for educational purposes, and advancing digital skills among teachers and students (#HITSA, 2015).

—

[45] *Koolielu* in Estonian.

[46] *ProgeTiger* in Estonian.

[47] Programmes of relevance for art and craft teachers included the *SewingTiger*, also offering foundation to buy programmable embroidery machines, or the *AnimaTiger* offering amination training for teachers and organizing student animation competitions.

One of the more ambitious projects initiated by HITSA, together with the Ministry of Education and Research, is the *e-Schoolbag*[48] portal, offering free e-learning materials in Estonian language for all school levels based on the national curriculum. The project is funded by the Estonian government, which is investing more than 40 million euros in the development of e-study materials and the development of a digital graduation exam system (Kerb, 2015). Access to digital learning resources is one of the goals set up in Estonia's Lifelong Learning Strategy 2020 (Estonian Ministry of Education and Research, et al. 2014, p. 15), and is also related to what Charles (2009, p. 106) refer to as a "craze for paperlessness" in the Estonian government, aiming for paper free schools by 2020.

Although many major platforms and ICT training programmes are funded by the Estonian government, commercial actors are also part of the educational technology landscape. Among these is the digital management tool *eKool*, the biggest learning management system in Estonia, used to communicate timetables, assessments and grading between teacher, students and parents and used by 85% of all schools in the country in 2016 (Enterprise Estonia & Estonian Investment Agency, 2017).[49] In 2019, the Estonian government also initiated a funding scheme for start-ups in educational technology. In addition to providing digital solutions to Estonian schools, the initiative provides support for educational technology companies to enter and establish themselves in the international market and "make Estonian schools pioneers of education innovation" as put by Marika Truu, head of *Startup Estonia* (Otsmaa, 2018, para. 3).

Educational technology is in other words not only a symbol of the success story of e-Estonia but is also perceived as a likely future export item. But in addition to this western orientation, the belief in technology as an agent of change and the educational emphasis on training in "industrial specialities based on contemporary technologies" (Lauristin, 2003, p. 610) can also be understood as an inheritance from the Soviet period (Runnel et al., 2009). The following two sections discuss how these characteristics have contributed to the development of visual arts education in Estonia, and to the training of art teachers.

—

[48] *e-Koolikott* in Estonian.

[49] Established in 2002 as a collaboration project between the private sector and the state but sold to private investors in 2005 (ekool.asia/en/history-of-ekool).

4.1.3 Visual arts education in Estonia

Although technical drawing and handicraft was an important part of the 19th century peasant schools, art first emerged as a separate subject in the curriculum in the 1920s during the formation of the public school in the independent Republic of Estonia (Autio, Soobik, & Thorsteinsson, 2015; Kärner, 2006; Ruus, 2012b). Art was taught for two hours a week and consolidated through such investments as specific education for art teachers and the development of Estonian language textbooks for art. According to Estonian art education historian Eve Kärner (2006), the teaching was mainly focused on drawing from nature but also came to include elements such as drawing from imagination, the study of colour, printmaking and watercolour painting. There was also an emphasis on folk culture, such as depicting figures from national epics and patterns from national costumes.

During the first ten years of the Soviet era, visual arts education was practiced much like during independence, but this changed with the gradual adaption of centralized curricula. In the 1956 syllabus, art was allocated one hour a week and distributed as follows: "15 hours were devoted to drawing after nature, 15 hours to decorative drawing (depicting of patterns), 6 hours to the depiction of state holidays and art conversations about socialist art" (Kärner, 2006, p. 4). The subject was now synonymous with drawing, carried out through prescribed programmes and schemes and an emphasis on the depiction of flat items and geometrical shapes (Kärner, 2006; Vahter, 2016, p. 52, 2018, p. 579). Motives and examples were chosen to foster Soviet patriotism, including an emphasis on public holidays and the influence of Russian painters on foreign artists (Pilve, 2014, p. 54). A certain amount of the teaching time was also devoted to technical drawing, and from sixth grade, a course in *draughtsmanship* (technical drawing or design) replaced art altogether (Autio et al., 2015; Kärner, 2006; B. King, 1948, p. 62; Šapovalenko, 1963, p. 97; Yusov, 1978, p. 9).

The replacement of art with technical drawing in 1956 was part of the general "polytechnicalisation" (Viktorova, Ostashova, & Shevchenko, 2015, p. 80) of the USSR educational system in the 1950s, in order to prepare children for practical life and industrial work (Autio et al., 2015, p. 25; De Witt, 1961, pp. 78–79; Pitt & Pavlova, 2001, p. 231; Simon, 1954; Small, 1984; Zajda, 1980, pp. 182–183). Polytechnical education was taught across the curriculum with the aim to both teach children practical skills of using tools and other equipment in the manufacturing processes, and to cultivate a positive attitude towards physical labour:

> Polytechnical education gives the pupil a knowledge of the main branches of production and the scientific principles on which these depend, and accustoms him to handling common tools and instruments of labour. This training helps to develop creative technical abilities and to inculcate a love and respect for physical labour and work. (Šapovalenko, 1963, p. 18)

While the 1950s curriculum allocated so few hours to visual arts education and structured it as vocational-industrial training, focused on drawing, a parallel development of fine arts education emerged throughout the Soviet union (Yusov, 1978, pp. 9–10).[50] Soviet schools had full programmes or "circles" of extracurricular activities to make sure that the children made good use of their free time, often consisting of cultural activities such as arts and crafts. The circles were organized by the school and free of charge (De Witt, 1961, p. 127). Larger cities also had municipal art schools where children were trained by professional artists to deepen their skills in a specific medium, like drawing, painting or sculpture, based on the European academy or atelier tradition where a master artist supervises a small number of students in making realist art.[51] Both extracurricular art circles and children's art schools had a proper syllabus, often corresponding with that in the compulsory school in order to benefit other subjects (B. King, 1948, p. 132).

In 1988, the number of hours devoted to visual arts education was doubled from one to two hours per week from the first to the fifth grade, and art was reintroduced in the sixth grade and up (Kärner, 2006). This model remained largely intact until the first official curriculum after independence was implemented in 1996 (Viirpalu et al., 2016, p. 57). In this curriculum, the subject was officially named art after having gone under different names such as "drawing", "art studies" and "art and handicraft studies" throughout the Soviet period and before (Vahter, 2018, p. 579). The move away from Soviet arts and crafts education continued with the

—

[50] Apart from the communist ideology in the Soviet model of vocational-industrial training, contemporary Estonian education hosts a number of school subjects of a similar character. The mandatory subject *technology* combines elements from polytechnics such as the ability to use and develop technological tools, technical drawing, design and crafts with home economics, cooking and traditional handicraft. The aim is to be able to handle everyday technology, eat healthily and manage household chores and also to get an overview of education and professions associated with manufacturing and processing (Autio, Soobik, & Thorsteinsson, 2015, p. 25; Estonian Ministry of Education and Research, 2014b).

[51] The circles and art schools were typically three-hour classes, held twice a week, although especially talented pupils could receive more teaching and even get accepted to boarding schools for artistically gifted children, located in the large cities in connection to art academies (B. King, 1948, p. 69; Putko, 1972, p. 400; Yusov, 1978, p. 8).

2010 art curriculum, where Estonian art education researcher Edna Vahter (2015, p. 254, 2016, p. 52) has identified a shift from "product-making" to learning processes, and an increased emphasis on conceptual and contemporary art. The focus on art history in older grades also shifted to include practical work.

At the same time, argues Vahter (2016), the shift towards idea based art the in curriculum does not automatically implicate a corresponding shift in art educational practice. Art is still synonymous with art history in many Estonian grammar schools and with drawing in primary school where it is taught according to older, prescriptive curricula that prioritize "neatness, good technical skills and accuracy" over ideas and finished products, and "nice and clean work" over ideas and processes (p. 53). This persisting idea is further characterized by a teacher-centred pedagogy:

> In a typical art lesson, the teacher presents a topic to the children, gives an assignment with a model example of the expected outcome, and pupils follow the teacher's instruction directly as described above. Visits to schools and classrooms show that often pupils' artworks look similar, sometimes even identical, on the wall. (Vahter, 2016, p. 52)

Kärner (2002) perceived that there was already a similar gap between curricula and educational practice with the National curriculum of 2002, not least in the Russian speaking parts of eastern Estonian schools, due to the lack of relevant educational material. When the article was written, there were no textbooks in Russian language available on the methods and themes of contemporary art, and all the bigger museums or contemporary art halls were still located in Tallinn and Tartu. This geographical inequality is still reflected in the situation for rural schools, who are often limited to local museums for study visits. Furthermore, Estonian art teachers have very different educational backgrounds, depending on when and where they were trained. The next section will outline different paths to becoming an art teacher, and how this relates to the art educational traditions described here.

4.1.4 Art teacher training in Estonia

Teacher training has been organized in Estonia since the late 1600s in the form of teacher seminars.[52] These where supplemented in 1802 with a pedagogical institute at the University of Tartu (Tartu Ülikool, TÜ) for the

—

[52] A non-university institution for the training of teachers, equivalent to a "normal school" or "teacher training college".

training of secondary school teachers, while the training of primary school teachers remained in the seminars.[53] Students entered the teacher's seminars after the six-year compulsory school, at age 13-14. The studies lasted for six years and included practices of singing, drawing and craft. The secondary teacher training at TÜ lasted one to two years and included studies of pedagogy, history of education, classroom observations, lesson planning and teaching (Krull, 2007, p. 71; Sarv, 2014, p. 110).

During the Soviet occupation, teacher training in Estonia was administrated by the USSR Ministry of Higher and Specialized Secondary Education (Zajda, 1980, p. 238). Primary school teachers were trained in pedagogical schools based on the earlier teacher seminars, while teachers for higher elementary school grades and secondary school were trained in universities, pedagogical institutes or higher education institutions specialized in for example art, music or psychical education (De Witt, 1961, p. 297; Sarv, 2014, p. 110; Varik, 2013, p. 195; Zajda, 1980, p. 239; Žukovs, 2013, p. 182). In 1952, the Tallinn teachers' seminar was renamed Tallinn Pedagogical Institute[54] (TLÜ) and became the second institution in Estonia for the training of secondary school teachers alongside the renamed Tartu State University (Krull, 2007; Sarv, 2014; Tamul, 2009).[55]

There were two ways of getting a degree to teach art in compulsory school or art schools at this time in Estonia. Aspiring art teachers could either attend the State Art Institute of ESSR[56] (ERKI) to study fine art or go to the Tallinn Pedagogical Institute (TLÜ), who offered teacher training

—

[53] The late 19th century was characterized by an increased russification in Estonian politics, and many teacher training institutions were shut down, and reestablished during the independence years (1917–1940) through initiatives from among others the Estonia Central Teachers' Union (Rõuk, Van Der Walt, & Wolhuter, 2017, p. 110; Sarv, 2014, p. 109-110).

[54] Established as *Tallinn Teachers' Seminar* 1919 the institution has gone through several name changes: *Tallinn Teachers' Institute* 1947–1952; *Tallinn Pedagogical Institute* 1952–1992; *Tallinn Pedagogical College* 1992–2005. In 2005 the college merged with Tallinn University into *Tallinn University School of Educational Sciences* (TLÜ, 2019a). For clarity reasons, the institution is referred to as TLÜ throughout this dissertation (short for Tallinna Ülikool, the current name in Estonian).

[55] While teachers were responsible for the upbringing of the new Soviet citizens, the teacher training in all these institutions was highly politicized (Krull, 2007, p. 73; Varik, 2013, p. 195). In the 1949 syllabus for teacher seminars, 54 out of 160 hours were spent on ideology training (such as the Soviet patriotism, the organization of pioneers and labour training) compared to six hours for aesthetical education. After Stalin's death in 1953, the institutions gradually gained more autonomy. Although the ideological framing remained, didactics was reemphasized and the school practice period at secondary teachers was prolonged, including visits to art and hobby schools (Krull, 2007, p. 73; Pilve, 2014, p. 56; Žukovs, 2013, p. 183).

[56] Renamed *Tallinn Art University* in 1989, and *The Estonian Academy of Arts* in 1995.

with drawing as a major in combination with technical drawing, crafts and home economics (TLÜ, 2019a; Varik, 2013, p. 200). The State Art Institute was based on the Applied art Schools in Tallinn, that from 1951 also took over education in free art from the Tartu Art Institute that was considered too "bourgeois" and "nationalistic" (Helme, 2002, p. 9; Kalm, 2017; Sepp, 2002, p. 45). The school was divided into departments specializing in certain mediums and techniques, such as sculpture, drawing, painting, graphic art, architecture and art history (Kalm, 2017).

Following the logic of polytechnization, the TLÜ graduates where prepared to teach in several technical/vocational school subjects such as *drawing, technology* and *draughtsmanship*. The art school graduates, in turn, became specialized in one medium and received relatively little pedagogical and ideological training compared to the TLÜ students. The status of the subject varied depending on where and how it was practiced. This meant that although it was also *possible* for ERKI graduates (who had spent five to ten years studying to master one single medium) to teach art in secondary school, it was not always desired, as explained by art historian Igor Golomštok in his overview of the organization and training of artists in the Soviet Union:

> The most "controllable" students, having absorbed from their education not only the technique, but also the ideology of the socialist realism, and having secured the requisite party testimonials and recommendations, remain in the art workshops of their institutes, i.e., they continue their studies in a kind of postgraduate course of the arts. These are the future leading cadres of official art who will carry on the work of their teachers. Some of them, who have shown their worth not only creatively, but also ideologically are sent to teach in art schools, while others are given jobs in general secondary schools where drawing is the least important of school disciplines. (Golomštok, 1985, p. 33)

These two paths to becoming an art teacher reflect the double identity of, on the one hand, a subject occupied with basic cultural techniques, positioned in compulsory school, and on the other hand medium specific academic artistic training, mainly aimed at teaching in extracurricular art schools. From 1988, these two paths merged in a teacher training program at TLÜ, focusing only on visual arts education. This five-year programme combined didactics and ideology training with several practical and skill-based modules, focusing on classical mediums such as painting, sculpture and draw-

ing, and providing a compromise of sorts between the academic tradition and the USSR model of teacher training.[57]

TLÜ also offered a one-year didactic introduction for trained artists who wanted to develop their pedagogic skills and qualify for teaching positions. From 2016, a similar model of professional pedagogic training for artists has replaced the teacher training programme altogether, both at TLÜ and TÜ. Art teacher training is currently offered only at master level and for applicants with a bachelor's degree in art or art related subjects such as crafts or art history (TLÜ, 2019b; TÜ, 2018). Both programmes contain a placement period of 24 ECTS and provide a teaching qualification, but they differ considerably between universities, again reflecting the complex identity of visual arts education in Estonia:

The master's at TLÜ is offered in cooperation with the Estonian Academy of Art and prepares the students for work not only in compulsory education but also in museums or extracurricular art schools (EKA, 2019; TLÜ, 2019b). While this programme can be said to continue the academic tradition of skills training and medium specificity, TÜ has chosen the parallel stream of multi-disciplinarity through their master's programme *Teacher of Art and Technology*. Graduates from this programme get a teaching qualification in two different specializations, one in the fields of arts (visual arts, music and dance) and one in technology (crafts, home economics and smart technologies), targeted at teaching mainly in primary and secondary school, but also in art or music schools, depending on specialization (TÜ, 2018).[58]

—

[57] The updated arts education programme at TLÜ was partly an effect of the Teachers' Congress 1987 that became a kind of turning point in Estonian educational politics and marked the beginning of a series of reforms that allowed educational institutions greater autonomy (OECD, 2001, p. 54, 2016, p. 2; Rõuk et al., 2017, p. 122). The reforms also meant a change towards western models of higher education in terms of credits and degree structure, consolidated between 2003-2006 when the teacher training programmes in Estonia were restructured according to the Bologna declaration with two separate study circles (bachelor's and master's) and a unified credit system (ECTS) (Jakku-Sihvonen, Tissari, Ots, & Uusiautti, 2012).

[58] TÜ, along with TLÜ and some of the colleges around the country run by Tartu University, such as Narva College and Viljandi Culture Academy also offer courses in art for primary teachers. Art in primary school is taught by the class teacher and is given as a subject within the primary teacher training with 9 credits.

4.2 Sweden: Setting the scene

Compared to Estonia, with its developed system of extracurricular art activities for children, visual arts education in Sweden is very concentrated on the compulsory school where it has remained a separate subject since around 1870 (Åsén, 2017, p. 14). School art education in Sweden, like in Estonia, is grounded in a technical tradition that was later supplemented with phycological and communicative approaches. Indeed, as discussed in the previous research section, the history of Swedish visual arts education is often described through a fixed narrative of three distinctive traditions: the technical, the psychological and the image-centred, all visible in contemporary teaching practices. The continuation of past traditions also reflects the fact that the Swedish school system is fairly consistent compared to Estonia, without any ruptures corresponding to the effects of the Soviet regime on Estonian education. Since the 1990s however, both school systems have experienced a turn towards increased competition, decentralization and goal orientation. This development is also linked to processes of school digitalization in each national setting.

This subchapter is structured along the same headings as the previous one but focuses on the themes and periods highlighted by participants and on official accounts of the subject and its development in Sweden. It starts with 1) a discussion of the organization of compulsory education, from the formation of the public school in Sweden up to the present, followed by 2) an overview of school digitalization initiatives, including recent revisions of the national curriculum to strengthen digital competence among students, 3) an introduction to the dominating narratives about art educational traditions in Sweden with a special emphasis on the set up of the art classroom, and 4) a discussion of art teacher training, with a special emphasis on the art teacher programme at Konstfack University College of Arts, Crafts and Design and on the higher education reform where art is offered as a second subject in recreation instructor training.

4.2.1 The organization of compulsory education in Sweden

The first compulsory school form in Sweden was the *elementary school,*[59] introduced in 1842 with the aim of controlling the peasant class and turning their children into well-functioning citizens and workers. The main focus was on bible studies and learning Christian values but it also included other

—

[59] *Folkskola* in Swedish.

basic skills such as reading, counting and craftwork (Edgren, 2015, pp. 114–115; Richardson, 2010, p. 52; Sandin & Sundkvist, 2014, p. 41).[60] Alongside this development of the public school there was a second school form, the *grammar school*[61], which could have up to twelve grades and where wealthy, urban families sent their children. Children were admitted from grade four and up but well-off children often spent their first three years in private schools rather than in the elementary school that had a reputation as a school for the poor.[62] This resulted in a parallel school system where the children of peasants and workers attended elementary school while the children of urban, middle class families went to private schools and grammar schools (Edgren, 2015, p. 113; Lindensjö & Lundgren, 2014, p. 34; Richardson, 2010, pp. 56–57, 100; Sandin & Sundkvist, 2014, p. 52).

In response to this segregated two-tier system, a model of a unified, nine-year compulsory school was legislated in 1962. The merging of the two school systems meant more heterogenous student groups, which was challenging for the teachers (Edgren, 2015, pp. 123–125; Lindensjö & Lundgren, 2014, p. 66; Richardson, 2010, p. 115; Sandin & Sundkvist, 2014, p. 86). In the left wing political climate of the 1970s, the new unified compulsory school system was also seen as way to abolish the class society and a lot of emphasis in the curriculum was put on establishing social responsibility and basic civic values (Edgren, 2015, pp. 125–126; Lundahl, 2005, p. 12; Sandin & Sundkvist, 2014, p. 113).

These social democratic school reforms culminated in the 1980 curriculum that also put a lot of emphasis on cultural orientation and on the aesthetical subjects (Richardson, 2010, p. 184). This curriculum further differed from earlier versions by being much less detailed than the previous, and instead oriented around results and goals, a change that left much of the implementation and regulation to the individual schools and teachers to decide (Lindensjö & Lundgren, 2014, p. 83). For Swedish educational researcher Lisbeth Lundahl (2005, p. 13), this curriculum marked the beginning of a comprehensive decentralization process in the Swedish school system, leading up to the next big reform in 1991 when the responsibility

—

[60] In 1882, this four-year school was extended to six years and the attendance requirements where toughened. Two optional years were also introduced in order for children to maintain their knowledges up to their Lutheran confirmation, which usually took place at the age of fourteen. In 1918 these two years became optional and the emphasis moved from catechism to citizenship education and vocational training (Edgren, 2015, p. 121; Richardson, 2010, p. 94; Sandin & Sundkvist, 2014, p. 69).

[61] *Läroverk* in Swedish.

[62] Starting in 1894, before that it was possible to do all nine years in the grammar school.

for the educational system was moved from the state to the municipalities in a model of self-governance.

During the early 1990s, the sitting non-socialist government introduced a market model for schools, granting private schools the same access to public funds as municipal schools. These "free schools",[63] as they were known, were allowed to be run on a profit basis which led to the establishment of several new actors, but also to increased competition between schools, both municipal and private.[64] Each child would bring with them a certain sum from the public funding for schools, meaning that all school forms were free of charge, and parents would get to choose what school they want to send their children to (based on, for example, school results or specific profiles). The idea was to raise the quality of the schools through competition and break the segregation between different residential areas, but in reality the school results have steadily fallen since the free school reform and the differences between different schools have increased, a development regarded by some authors as a return to the parallel school system of the 1800s (e.g. Edgren, 2015, p. 128; Holmlund et al., 2014, pp. 52–55; Lundahl, 2012, p. 217; Sandin & Sundkvist, 2014, p. 101).

The changes taking place during the early 1990 also affected the status and the professional autonomy of the teachers. Although the new curriculum gave teachers more freedom to interpret the content, the change to municipal rule meant a decline in professional autonomy for individual teachers, with increased demand on workplace presence including after teaching hours and in-between semesters (Holmlund et al., 2014, p. 43; Ringarp, 2008). The model of self-governance is further based on "contract thinking", holding schools and teachers accountable for the results achieved (Lundahl, 2005, p. 24).[65] Another process that has opened up for commercial actors is the digitalization of the Swedish educational system, through the introduction of digital tools and systems and also through revising the curriculum to fit an imagined future labour market (Player-Koro, 2018, p. 70). This development is discussed in the following section.

—

[63] *Friskolor* in Swedish. The system is similar to that of "charter schools" in the US or "academies" in the UK.

[64] In 1992 1,5 % of all Swedish students attended a private school, 2018 15,2%. For upper secondary schools (gymnasieskolor) the number is even higher, and in 2018 a third of all students attend a private school (Skolverket, 2020).

[65] While maintaining the contract thinking, some free schools have also supplemented the curriculum with pre-made teaching packages and plans that are to be implemented by the teacher, limiting the professional freedom and room for manoeuvre (Lundahl, 2012, p. 219; Ståhle, 2006).

4.2.2 School digitalization in Sweden

The digitalization of the Swedish school system has been going on for almost 50 years but with varying objectives and methods, depending on how computers and computerisation is perceived in society but also on the organization of the school system. Common to most of these computerization projects is, however, that they subscribe to a "techno-determinist discourse where digital technology has the possibility to revolutionize teaching, schools and the educational system" (Player-Koro, 2018, p. 69, my translation). Research and evaluations have also described the efforts to digitalize the Swedish school system as a "push driven" process, being forced upon schools by state, municipal or private stakeholders rather than being requested by teachers or students (Karlsohn, 2009, p. 324; Rahm, 2019, p. 41; Riis, 2000, p. 15; Söderlund, 2000, p. 185).

Computers were first introduced into the Swedish school system during the 70s and 80s, as calculation machines and also through the introduction of computer science into the national curriculum in 1980. This new school subject was to be integrated in existing subjects, mainly mathematics and social sciences. It emphasized the role of computers in society and the technical principles behind computation and programming, but did not demand access to actual computers (Hylén, 2011, p. 28; Riis, 2000, p. 11; Söderlund, 2000, p. 69).[66] The teaching also had a strong political orientation including democratic aspects and the risks involved in computerization, emphasising that students must understand that "computers are a technical aid controlled by man" (Lrg 80, quoted in Söderlund, 2000, p. 72, my translation). In the mid-1980s, the government recommended that actual computers should be introduced into schools and the municipalities received state funding to invest in computer classrooms for secondary schools (Hylén, 2011, p. 28; Riis, 2000). After these investments in hardware, a second state funded computerization campaign was introduced, focusing on software development and pilot school projects (Riis, 2000, p. 13; Söderlund, 2000, pp. 88–91).

In 1992, the newly founded Swedish National Agency for Education[67] received a commission from the government to renew the computer policy for public schools. The emphasis on democracy and societal effects of computer power from the 70s and early 80s initiatives was then partly downplayed. In its place, a view on computers as tools and on schools as having

—

[66] At least not until grade 10.

[67] Skolverket, which later replaced Skolöverstyrelsen.

to "keep up" with the technical development emerged (Hylén, 2011, p. 31; Karlsohn, 2009, p. 112; Rahm, 2019, p. 120; Söderlund, 2000, p. 96). State run projects during this time focused on providing internet access and email addresses to teachers and students in all schools, developing public online resources and offering courses in digital competence for teachers (Hylén, 2011, pp. 31–32; Riis, 2000, p. 18; Söderlund, 2000, pp. 101–109). The shift to municipal management and the introduction of private companies in the Swedish school system also meant that more actors became involved in the computerisation of schools, such as foundations and corporations (Hylén, 2011, pp. 33–34; Karlsohn, 2009, pp. 121–122; Riis, 2000, p. 16).

Since then, there have been no large-scale state-funded IT project for compulsory education. Instead, municipalities have invested heavily in "one laptop per child" (1:1) projects, as well as in different learning management systems (Grönlund, 2014; Hylén, 2011, p. 47; Winman, 2018, p. 13). These investments are expensive for municipalities, and have brought a higher student-teacher ratio, as well as an increased administrative workload for teachers (Grönlund, 2014, pp. 33, 70). Martin Tallivid (2015, p. 21) have studied the consequences of two 1:1 pilot projects and relates this increased workload to a long tradition of teacher autonomy in Sweden, given that while the decision and procurement behind school digitalization is often made on a municipal or management level, the actual classroom implementation is left to the individual teacher.

The division between municipal decision makers and schools reveals a limited insight into the everyday reality of teachers' professional practice, and priority of centralized systems over local needs (Grönlund, 2014, p. 47; Salavati, 2016, pp. 239–240). Researchers have also criticized commercial companies providing e-services and hardware intended to direct pedagogical practice, educational policy and teacher subjectivities in line with their own interests (Mårell-Olsson, 2012, p. 211; Player-Koro et al., 2018). Major tech companies like Google, Apple and Microsoft not only provide hard and software solutions, but also offer professional training for teachers and additional alternative curricula. By reshaping the modes of teaching and communication in schools, these companies gradually change the public perception of education and knowledge into a product that can be measured, marketed and sold to students and parents (Forsman, 2019, pp. 212–214).

Compared to the educational computer politics in the 1970s and 80s, a discursive shift has occurred, from schools emphasising the necessity to control technology development to the expectations that technology will (and should) change the way education is perceived and practised (Fors-

man, 2019, p. 205; Rahm, 2019, p. 120). In Swedish educational policy this is visible not least in the national curriculum that was revised in 2017 to align with the national strategy for the digitalization of education. In the revised curriculum, earlier terms such as ICT have been replaced with *digital competence*, according to Ilomäki, Kantosalo and Lakkala (2011) a "more or less a political concept, reflecting beliefs and even wishes about future need" with "its roots in the economic competition in which the new technologies are regarded as an opportunity and a solution" (p. 1).[68] The term is also used in the curriculum in the meaning of social or critical perspectives, traditionally associated with the term *media literacy* or *digital Bildung*, but in most cases to describe the *use* of digital tools (Godhe, 2019, pp. 29–30).

It is also worth noticing that the emphasis on mathematics and social sciences from the first 1980 computer science curriculum persists – most of the revisions are made in these subjects, including all objectives concerning programming. The learning objectives in visual arts, on the other hand, remain unchanged, because it was considered as already covering digital tools and competences, due to the 1980s transformation of the subject from a drawing to a communication subject (Skolverket, n.d.). These changes in Swedish visual arts education are discussed in the following section.

4.2.3 Visual arts education in Sweden

As is the case in Estonia, visual arts have been taught in Sweden in many forms before the public school emerged in the mid-1800s, as private home tutoring and in studios for vocational training in arts and crafts. The method used then was mainly individual tutoring where the master or adult was instructing the child or student. When drawing was introduced in the first public school in the late 1800s, this was not an option. The shift to mass education meant large classes – sometimes between fifty and one hundred pupils in the same small room – and limited access to drawing materials. These new conditions demanded other methods for drawing instruction than individual tutoring (Pettersson & Åsén, 1989, p. 72).

In her dissertation about Swedish visual arts education during the nineteenth century, Ulla Frost (1988, p. 86) identifies two separate strategies for art teachers to cope with big classes and overcrowded classrooms:

—

[68] The political-economic assumptions associated with digital competence vary on a national level. Whereas the use of the term in the Nordic countries seems to be part of a of a techno-determinist and neoliberal discourse, the German equivalent medienkompetenz or digitalkompetenz is closer to the tradition of media literacy (cf. Gapski, Staufer, & Oberle, 2017).

simultaneous instruction, advocated by the Swiss educational reformer Heinrich Pestalozzi, and the Lancasterian system of *mutual instruction*. In the first case, children drew the same shape simultaneously after instructions from the teacher, either verbal or illustrated on the blackboard. In the second, more extreme method, older students or those who were far-ahead in a certain subject were engaged to teach the younger children in small groups, often within the same big classroom. Apart from managing big classes these methods were also meant to help children develop diligence and discipline (Frost, 1988, p. 88; Hellman, 2017, p. 24).[69]

In 1870, a state committee was formed to coordinate and equalize the drawing instructions in all school forms. The committee recommended a method developed by one of Pestalozzi's successors, Adolf Shulmann, that built on the tradition of technical line drawing (Åsén, 2017, p. 14; Frost, 1988, p. 122; Pettersson & Åsén, 1989, p. 78).[70] The committee also suggested that drawing should become a mandatory subject in all school states, with a national standardization of teaching hours. The proposal was efficient and in 1882, when a new school statute was approved, drawing became a separate subject throughout the school system (Nordström, 1994, p. 356; Pettersson & Åsén, 1989, p. 89).[71]

In the beginning of the 20th century, visual arts education became increasingly preoccupied with aesthetical education and consumer knowledge. With industrialization came a need for developing citizens with a sense of beauty and "good taste", as well as appreciation of national folk art and handicraft (Åsén, 2017, p. 15; Pettersson & Åsén, 1989, pp. 81–82). Around the turn of the century, psychology also emerged as a scientific subject, and sparked an interest within visual arts education in children's development and in their drawings as expressions of inner emotions.[72] The

—

[69] These mass education technologies have been identified by Pettersson and Åsén (1989, p. 74) as the start of as a separation between school drawing and artistic drawing, where the former was mainly considered a useful subject to educate workers for the craft and industrial production.

[70] The Shulmann also introduced grids and plaster models as aids to help the pupils move on from copying two dimensional templates to actual drawing from nature. The method was described in instructional books for teachers, available in Swedish for all stages, and all practicing art teachers were summoned to be trained in this method.

[71] In elementary school, it was taught two hours a week, as for the students in grammar school who took classical languages. In the grammar school science programmes, drawing was taught three to four hours a week, which shows it was considered mostly a preparatory subject for working in the construction industry.

[72] This interest was shared with modernist artists during the same period, who turned to children's art, outsider art and "primitive art" for authenticity and inspiration (Låby, 2018, p. 126).

influences from developmental psychology and modernist art brought about the end of the Schulman method. Instead of naturalistic depictions, spontaneous drawing was encouraged as a way for children to develop mentally and find joy in schoolwork (Åsén, 2006, p. 112). Drawing was seen as a way of increasing learning and making the child more engaged, not only in art but in all school subjects, and in the 1919 curriculum of the elementary school, it was stated that drawing should be integrated with other subjects. This development increased the status of visual arts education, but also positioned it mainly as a support function for other, more theoretical, subjects. As Swedish art education historian Gunnar Åsén (2017, p. 15) points out, this idea of visual arts education as a way to encourage schoolwork and boost academic performance in all subjects is still very much alive.

Along with the advances of modernist art and child psychology, free expression came to dominate Swedish visual arts education during the 1950s and 1960s.[73] Part of this discourse of well-being was also the notion that the aesthetic subjects should function as a "breather" for the students, in between the more theoretically demanding subjects (Hellman, 2017, p. 24; Låby, 2018, p. 84; Pettersson & Åsén, 1989, pp. 94–95). With the merging of the elementary school and the grammar school in 1962 came a new curriculum that consolidated the status of visual arts education as a recreation subject (Åsén, 2006, pp. 114–115). In line with the personal choice of the pupil, it was emphasized that the art classroom should provide more materials than just pencils and papers and also allow for such techniques as painting, sculpture and printmaking. This in turn demanded well-appointed art classrooms with water and sinks, storage facilities, ample working space and ventilation, and in the overall expansion of the school system in Sweden many new schools were built with these facilities, whereas older schools had art classrooms that did not allow for much more than drawing. These different material conditions led to very different configurations of the subject and its content (Låby, 2018, p. 95; Pettersson & Åsén, 1989, p. 103).

The emphasis on free expression and fine art was criticized during the 1960s and 70s, mainly from within the institutions training art teachers, where semiotics was introduced as a kind of "counter discourse" to the dominating subject traditions of development psychology and cognitive science (Lind, 2010, p. 86). The criticism was endorsed, and in the revised

—

[73] Many educators were influenced by Herbert Read's book, *Education through art* from 1943, and used this to argue for artistic expression as a way to free the minds of children (Hellman, 2017, p. 24).

curriculum of the compulsory school in 1980, art is described as a language in its own right and "an important means of communication, alongside reading, talking and writing" (Lgr80, quoted Pettersson & Åsén, 1989, p. 114, my translation). The name of the subject was also changed from drawing to "bild" in Swedish, meaning image, figure or picture (Åsén, 2006, p. 116; Nordström, 2019; Pettersson & Åsén, 1989, p. 114). In the 1990s, the idea of visual arts education as a communication subject was supplemented with theories of visual culture, where images are understood as an event that takes place in the meeting with the observer and where visuality and image making are understood as specific forms of knowledge (Hellman, 2017, p. 26; Lind, 2010, p. 86).[74]

This narrative of four distinct traditions (art as drawing and vocational training, art as personal expression and recreation, art as communication and art as visual culture) is very dominant in research and reports on Swedish visual arts education and has been important in the formation and identity construction of the subject. At the same time, it is important to point out that these traditions do not neatly replace each other, and that classroom practice does not always follow curricula (Åsén, 2006, p. 117, 2017, p. 17; Bohlin, 2017, p. 29; Marklund, 2019; Marner & Örtegren, 2013, 2014). As put by visual culture researcher Ulla Lind (2010), "parallel subject conceptions live on like cultural sedimentations of discourse from different times. This is true not least when it comes to visual arts education for different age groups, from pre-schools to the gymnasium" (p. 86).

As new objectives are added to the curriculum, old practices tend to live on resulting in an overcrowded syllabus where some things have to be left out. Åsén (2006, pp. 118–119) suggests that while the increased focus on analysis and theory in the aesthetic subjects is not compensated for with a corresponding advance of hands-on, practical exercises in other school subjects, art teachers might prioritize practical work to compensate for an over theorized school. Åsén also means that the previous traditions of self-expression and free creation have led to expectations among students and parents of a softer and less "school-like" subject.

—

[74] Art educational researcher Annika Hellman (2017, pp. 23–26) has shown that while the drawing exercises developed by *Pestalozzi* and his successors saw sight observation as an empirical method to get reliable information about the world, superior to other forms of knowledge retrieval, visual culture also meant a new way of understanding seeing as non-neutral, grounded in a certain "practices of looking" and the idea that images "do" something rather than merely represent the world (c.f. Sturken & Cartwright, 2009).

Expectations and traditions also shape the implementations of digital technologies in the visual arts education. Although digital tools and media images are part of the Swedish national curriculum for all age groups, the subject is still dominated by older cultural techniques such as painting and drawing. Researchers have related this persistence to the strong tradition of technical instruction where digital image making can be considered a form of "cheating", but also to infrastructural conditions where investment in digital technology goes to other school subjects or to separate computer classrooms (Marner & Örtegren, 2013, 2014, p. 167). Others regard traditional techniques as a form of resistance against instrumentalist approaches in art, in favour of slow and explorative processes (Marklund, 2019). How visual arts education is carried out is of course also related to the organization of teacher training that is discussed in the following section.

4.2.4 Art teacher training in Sweden

The parallel school system in Sweden that existed up to 1962 is also reflected in the organization of teacher training, where teachers for the elementary school were trained in seminars and those aiming to work in grammar school at the universities (Bertilsson, 2015, p. 189). Drawing was included in the training of class teachers in the teacher seminars, and up to 1879 some specialized drawing training for teachers was offered by the foundational school at the Academy of Arts (Bertilsson, 2015, p. 195; Nordström, 1994, p. 357). With the decision to make art a mandatory school subject in 1870 came the need for a specialized art educational programme, and in 1879 the newly founded Technical School in Stockholm offered a three-year seminar for drawing teachers in the Institution for Industrial Arts (Nordström, 1994, p. 358).[75]

Located at the technical school, this first art teacher training programme was firmly situated within a technical tradition. The students were trained in industrial techniques such as linear drawing, shadow and light theory, perspective drawing and drawing from nature. This technical-vocational bias was questioned in the 1930 in a debate advocating that school art should not only be about skill training but also offer students orientation in art and aesthetics, and that the training of art teachers should reflect this broader objective. The question was resolved in 1941 when the Technical

—

[75] Due to the low salaries, drawing teacher was to begin as an occupation mainly for women and in the first years of the new programme there were only female applicants (Bertilsson, 2015, p. 205; Nordström, 1994, p. 358).

School was reorganized and renamed University College of Arts, Crafts and Design (Konstfack) (Nordström, 1994, p. 362; Pettersson & Åsén, 1989, p. 89). The organization, with different departments specialized in different material and techniques, was kept however, and compared to other art academies in Sweden Konstfack remained a school for vocational crafts and design professions rather than an academy for the free arts (Edling, 2010, pp. 93, 144).

With the introduction of a unified school system, teachers previously located in the grammar schools with privileged and mainly motivated students, now faced far more diversified student groups. As previously discussed, this led to criticism from art teachers and student art teachers, who argued that the rapid development of new image media such as cartoons, television and film has led to a new image saturated society that must be dealt with in schools (Kockum et al., 2019; Lind, 2010, p. 84; Nordström, 1994, pp. 364–366; Pettersson & Åsén, 1989, pp. 106–107). The art teachers and student teachers supporting this demand organized in one union while others, promoting more conservative ideas, joined another, leading to a factioning of the art teacher force. Besides wanting to reform the subject, the student art teachers in the union opposing the technical and expressionist traditions demanded more influence over their training. After some internal conflicts in the union, the head of the visual arts education department at Konstfack resigned in 1967 and was replaced by Gert Z Nordström, who became the unofficial representative of the image-centred or communicative orientation in visual arts education in Sweden (Kockum, 2019; Nordström, 1994, pp. 364–366, 2019; Pettersson & Åsén, 1989, pp. 106–107).

Under the new head of department, art teacher training at Konstfack took on a new study plan that included courses in photography, video, mass media images and environmental knowledge. The training also gained a stronger research basis through the introduction of theoretical perspectives from semiotics, communication theory and theories of the public sphere. This approach to visual arts education was further promoted through thematic weeks and books produced by teachers in the institution. These initiatives often addressed current political issues, such as environmental concerns or urban planning, with an emphasis on critique of commercialism and consumerism (Kockum, 2019; Nordström, 1994, p. 375, 2019; Pettersson & Åsén, 1989, p. 109). Swedish society experienced a general leftist turn during the 1960s and 70s, but the visual arts education department at Konstfack remained one of the most radical institutions and faced repeated criticism about leftist indoctrination and ostracization of students

with different political opinions (Kockum, 2019, p. 129; Nordström, 1994, pp. 368–369; Pettersson & Åsén, 1989, p. 113).

The department, together with the unions organizing art teachers, were also active protesters against a proposal from the state committee in 1969 to make all teachers qualified to teach in two subjects.[76] The protests were efficient and in 1974 it was decided that art teachers could continue to teach one school subject (Nordström, 1994, p. 374; Pettersson & Åsén, 1989, p. 113). One of the motives behind the suggestions was to get teachers in other subjects to choose art as a second subject, in order to have more teachers qualified to teach in art, and when it was not adopted, the government instead decided to start a second training programme for art teachers in Umeå in the north of Sweden. The training in Umeå started in 1977 under Stig Eklund who also promoted art as mainly a communication subject, while taking a less political stance than his colleagues in Stockholm. Instead, the training became another move towards academization and work life adaption, manifested not least through the 1988 introduction of a programme with two specialties, art and one other subject (Eklund, 2002, p. 17; Jonsson Widén, 2016, p. 26).[77]

In 2001 there was a radical reform of the teacher training system in Sweden. The specialized teaching degrees were now replaced with one unified degree, and all students read 90 ECTS units of general education (Bertilsson, 2015, p. 201; Richardson, 2010, pp. 214–215). With this reform, the art teacher training program was extended from three years to 4.5 and all students were required to specialize in a second subject.[78] Students no longer received a qualification as art teachers, but as teachers with a specialization in art. Lundahl (2005) locates this reform within the neo liberal turn in Swedish educational politics during the 1990s, where teachers were expected to be flexible and faithful to the school as an organization rather than defending their subjects and where those "trained in specific subject areas" who "tend to maintain a restricted teacher professionalism" are co-

—

[76] For the art teacher training the proposal meant not only a bisection of the time spent on arts and visual culture, but also a division of practical and theoretical knowledge where the latter would become the responsibility of the pedagogical institutions in universities.

[77] The education at Konstfack was also "academized" when the school gained its official status as a university in 1978 (Edling, 2010).

[78] Konstfack offered *Media* and *Design* as second subjects besides *Art* and in reality, provided a broad training for visual art teachers, not two separate subjects (although it was possible to study other subjects via another university). From 2014–15 this model was replaced with two different programmes: one for teaching in grade 10–12, combining either arts and media or arts and design, and one art and crafts programme for teaching in grades 6-9 (Lind & Hasselberg, 2019, pp. 217–218).

nsidered an obstacle (p. 20-21). In other words, from these reforms it followed that art and other aesthetical subjects should be considered "no different from other school subjects" (SOU 2008:109, 2008, p. 279, my translation).

In 2010, the unified teacher training was replaced with a more differentiated model with four qualifications: pre-school teacher, primary school teachers, secondary school teachers (with two or three subject specialties) and vocational teachers (Bertilsson, 2015, p. 202; Richardson, 2010, p. 216). The government bill proposing this model also suggested that the training for recreation instructors should include one semester of art, music, home economics or physical education that would qualify graduates to teach that subject up to sixth grade (Prop 2009/10:89, 2010). In addition, several universities in Sweden were accorded the right to award qualifications in visual arts education from seventh grade and up.[79] As in Estonia, there are now several paths for a teacher in Sweden to get qualifications in teaching art, ranging from five years in a higher art institution to one semester of aesthetical courses in a teacher training programme mainly oriented toward recreation instruction. Art educators are, in other words, anything but a homogeneous group, which is reflected in some of the tensions within the subject that are discussed in the next chapter.

4.3 Summary

- Based on previous research, this chapter describes the development of the public school system, school digitalization initiatives, school art education and the training of art teachers in Estonia and Sweden.
- The aim of this chapter is to give an account of the historical context of visual arts education in each national case, to make possible a discussion of how the past is used and negotiated in the analytical chapters that follow.
- The school system in Estonia changed radically when the country was turned into a Soviet republic in 1940, with the introduction of detailed curricula and an emphasis on vocational training and is

—

[79] Gothenburg University (Academy of Design and Crafts), Dalarna University, Malmö University and Linnaeus University.

still struggling to implement the more general curriculum introduced after independence in 1991.

- The Swedish school system has been fairly consistent but was moved from state to municipal administration in the 1990s, leading to a decentralization of the educational system and a decrease in teacher autonomy.
- School digitalization in Estonia is implemented as part of the nation branding project e-Estonia, putting forth digital innovation and entrepreneurship as the secret behind Estonia's transformation from Soviet republic to a western market economy.
- Computers were introduced into the Swedish school system in the 1970s, with an emphasis on critical and democratic perspectives but are now implemented in more instrumental ways, through municipal 1:1 initiatives and the revision of the national curriculum to include objectives on digital competence.
- Visual arts education in both Sweden and Estonia was first introduced in public schools as a technical subject, focused on drawing and preparing for industrial work.
- Visual arts education in Estonia today has a double identity of, on the one hand, a technical school subject and, on the other hand, a fine arts subject practiced mainly in extracurricular art schools.
- Visual arts education in Sweden is currently conceptualized as a communication subject, inspired by studies of visual culture, but is in reality often dominated by traditional techniques and materials.
- The heterogeneous character of visual arts education in both countries is reflected in the training of art teachers who have historically been situated in both art schools and pedagogical institutions and taught both as a full programme and as shorter courses for class teachers and recreation instructors.

CHAPTER 5

Cultural techniques of visual arts education

The previous chapter introduced some of the dominating historical narratives surrounding visual arts education in Sweden and Estonia. This chapter takes this historical overview as a point of departure to show how the past matters for the way visual arts education is perceived and practiced today, by identifying some of the central cultural techniques of visual arts education and discussing how the participants in this study relate these to certain educational traditions. In Estonia, the Soviet era, associated with limited teacher autonomy, vocational training and formalism, constitutes a background against which contemporary art pedagogies and teaching practises are defined, and in Sweden, past traditions of skill training and expressionism are used to motivate the current understanding of visual arts education as a communication subject.

Based on material from the visual field notes, video walks and expert interviews the chapter further conceptualizes the art classroom as an archive where these different educational traditions are manifested in space, including different technologies and materials for image making that can be used by educators to negotiate the past. Understanding the use of older cultural techniques in school art education as a way of thematizing and rearticulating the subject and its traditions builds on the notion that media technologies used in visual arts education have the potential of self-reference. For Macho (2013, p. 31) it is precisely this *recursiveness* that characterises a cultural technique, and separates it from other, first-order techniques, such as agriculture or fire making. Krauss (2010) further argues that artistic practices not only can, but *should* reconceptualise older media, its rules and conventions. To frame media as a continuing source of meaning that can be reinvented and thematized through artistic practice, she converts McLuhan's famous phrase "the medium is the message" into "the medium is the memory" (Krauss, 2010, p. 19). In this chapter, the cultural techniques of visual arts education, the art classroom and art educators are

discussed as media that in different ways carry on and reinvent the memory of the subject.

5.1 "The medium is the memory"

Visual arts education is by definition a technical subject, whether the teaching involves pens or computers. This is evident not least in the historical organization of art teacher training that both in Estonia and Sweden has been situated mainly in technical or handicraft universities, and also in the way past traditions are described based on their dominant techniques. As argued above, most media used in visual arts education can be defined as second-order techniques that can thematize and reflect upon themselves. It is possible to make a drawing about drawing, a painting about painting or a photograph about photography. But visual arts education also relates to cultural techniques in the broader sense, as *civilizational devices*, a definition proposed by Siegert (2015) in his critique of a static separation between first and second order techniques. As shown in chapter four, visual art is seldom only about image making, but is also considered a place to develop more general skills and attitudes. What is included and excluded from school art education reflects prevailing ideas about culture and what it means to be a citizen, a worker or a human.

Visual arts education was previously named *Drawing* in both Sweden and Estonia.[80] For the participants in this study, as well as in official narratives of the subject, the name change from drawing to *Bild* (image, figure) in Sweden and to *Kunst* (fine art) in Estonia represents a movement away from skill training and an emphasis on the communicative and cultural qualities of the subject. Indeed, the re-naming of the subject brackets the operations through which artefacts and symbols are handled (drawing) and instead highlights outcomes of these processes (images and arts). In other words, a shift has occurred from talking about visual arts education as a cultural technique to talking about it as media expression or content. However, as Winthrop-Young (2013) puts it "there never was a document of culture that was not also one of technology" (p. 6) and the cultural artefacts and objectives highlighted in contemporary arts curricula cannot be separated from the technologies used to create or obtain them.

This subchapter discusses the discursive shift from techniques to content in visual arts education and how it relates to different educational ima-

—

[80] *Teckning* in Swedish, and *Joonistamine* in Estonian.

ginaries and to the introduction of new media technologies in the field. The subchapter is structured in three phases that can be identified in the historical development of the subject in both the Estonian and the Swedish context, namely 1) art as a school subject for developing general skills and attitudes, 2) art as drawing, and 3) art as a communication subject with strong links to the past.

5.1.1 A civilizing school subject?

As discussed in chapter four, visual arts education in both Sweden and Estonia was long considered a technical-vocational subject, aimed at work in the construction industry. Later, it also came to emphasize "life skills" such as well-being, fine motoric and communication competences. Despite the turn towards fine art in Estonia and communication in Sweden, the idea of arts as a generally useful subject still prevails and educators in this study from both countries ascribe the subject qualities that go well outside the national curricula, through phrases such as "holistic thinking"[81], "responsibility",[82] "transformation",[83] "courage",[84] "creativity",[85] "balance",[86] "empathic ability",[87] "playfulness",[88] "happiness"[89] and even "becoming human".[90] By giving "access to other worlds than that you came from"[91] art is thought of as a way to "form a person who is independent and who can think freely"[92], foster "balanced and well minded persons"[93] or simply "better people"[94].

The idea that knowledge can make you grow into a responsible, independent and democratic person goes back to the tradition of *Bildung*, a concept also used by some of the participants.[95] Other voices emphasize a more practical and labour-oriented perspective, such as many of the teachers active in social media discussion groups in Sweden where the aim

—

[81] iE11
[82] iE3; iE9; iE10
[83] iS5; iS6
[84] iE3; iE9; iE10; iS1
[85] iE3; iE9; iE16
[86] iE11
[87] iS1
[88] iS4
[89] iE9; iE13; iE15; iE16
[90] i5E
[91] iS1
[92] iE8
[93] iE11
[94] iE16
[95] iE8; iS1; wsS1

of the subject is motivated mainly through general abilities (such as creativity, patience, and concentration), the ability to navigate visual/digital culture and communicate through images, the supposed benefits in relation to other school subjects (such as how working with patterns helps mathematical thinking), or by enumerating different professions that demand skills associated with the subject (sometimes to the point of absurdity such as in the claim that "visual arts education helps children develop their fine motor skills, which is good if you want to become, say, a surgeon").

The status of visual arts education as a civilizing subject is otherwise perhaps most articulated in Estonia during the period when visual arts was partially replaced with construction drawing in compulsory education, and when the training for art teachers was combined with home economics and crafts. In Estonia today, crafts, home economics and computer related skills are taught as the subject *technology* and offered in combination with arts at the teacher training program at Tartu University.[96] This, indeed, very broad subject could just as well have been named *cultural techniques* (again, in the wider sense of the term). With the aim of "integrating mental work with manual activities", "cope in the world of technology and use technological opportunities sensibly and creatively" and "see and understand connections between scientific achievements and technological development and express opinions on technological development and changes in the world of labour" (Estonian Ministry of Education and Research, 2014b, p. 1), it focuses precisely on the relation between cultural development, manual work and technology. From this perspective, cooking and programming *do* belong in the same curriculum as techniques for processing distinctions between healthy and unhealthy or numbers and data. The upholding of such distinctions is for Siegert (2015, pp. 14–15) what constitutes basal cultural techniques. By acting as a mediator between the *real* and the *symbolic* they separate what we might call culture from the messy, unsorted others.

But technology, along with its predecessors draughtsmanship and polytechnical education, is not only interesting as an example of the emphasis on vocational-industrial training in Estonian schools, but also because they have contributed to limiting the content of visual arts education with which they share some overlapping objectives. While draughtsmanship was seen as a continuation of art or drawing in the Soviet educational system, and

—

[96] In a study of the subject *technology* in contemporary Russian education, James Pitt and Margarita Pavlova (2001, p. 233) conclude that it is an "extension of traditional Labour Training" as organized in the Soviet Union. With its emphasis on practical life skills, and a clear promotion of technical or manufacturing labour, the same can be said about *technology* in the Estonian national curriculum.

steered visual arts education towards technical drawing and design, the contemporary subject *technology* supplements visual arts education by taking care of areas that could just as well have been a part of the art syllabus, like creative problem solving, digital tools, visual communication or folk art (Autio et al., 2015, p. 25). These school subject thus narrow down the scope for visual arts education to work with *second order techniques* (Macho, 2013) for image making, leading to the double identity of visual arts education in Estonia as, on the one hand, part of a multidisciplinary, practical school subject and, on the other hand, a distinctly academic tradition of artistic skill training.

The latter, academic tradition of visual arts education dominated both the higher art schools and extracurricular art schools for children during the Soviet period. The emphasis was on imitating and mastering a craft such as drawing, sculpture or painting and becoming familiar with an established art canon "from the bison to the Barbizon" (Golomštok, 1985, p. 30), that is figurative art up to the mid-19th century realist period (Yusov, 1978, p. 9).[97] Soviet art schools, in other words, never entered the *post-medium condition* (Krauss, 2000, 2010). Instead, the Soviet academy tradition included both traditional and lifelike depictions with highly ideological content and more modernist approaches with an emphasis on form. This also came through among the participants in this study, and one of them describes how the latter *formalism* became a strategy for Estonian artists and art educators to avoid questions about ideological or potentially critical content during the Soviet era:

> The Soviet Union demanded to have certain content, so the artists who were opposing this demand were doing art *without* content. /…/ There was this regime of only two versions, either with heavy content that celebrates the Soviet Union, or without any content, which is a highly modernist way of thinking. This is a regime of thinking in universal categories and universal things are not contextualized. (*Teacher participant, EE)*[98]

What the participant here is talking about with "thinking in universal categories" is also evident in the renderings of the Soviet school system where knowledge and values are put forth as one-dimensional and unquestionable.

—

[97] Estonia still has a developed system of out-of-school cultural programs for children, both municipal and private. Most art schools are part of a municipal system, based on the Soviet system with bigger student groups and low tuition fees. There are also private schools, where parents pay a considerably higher fee, and private art studios.

[98] iE12

But although a lot can be said about the totalitarianism of the academic tradition, the art schools during the Soviet era at the same time offered a kind of haven compared to the art teacher training offered at TLÜ during the same period, described by one participant as "courses for ideal wives and husbands" that made "more contemporary minded people escape to the art academy".[99] The participants also describe the art teacher training at TLÜ as a safe position for artists and a possibility to "be lazy" because of the low status of the subject.[100]

The extracurricular art circles for children and adolescents, on the other hand, might have been conservative in their approach to art but at the same time offered young people a possibility to travel and attend art camps or visit art institutions in foreign countries (Golomštok, 1985).[101] There are also statements among the participants about the art schools in Estonia not being as ideological as the Soviet administration wished, but rather "a place for free thinking" and "a quite lovely tradition" as two participants put it.[102] Some hobby art schools in Estonia are still working in the atelier tradition but are no longer considered places of free thinking, but rather as examples of reactionary Russian culture, and artist studios managed by Russian artists and Russian speaking schools are described by the participants (also the Russian speaking ones) as far more conservative than the Estonian speaking schools.[103] In opposition to this Soviet tradition, the educators at both TLÜ and TÜ define their approaches to visual arts education by emphasising the importance of contemporary art.[104] The educator quoted above on the lack of context in Soviet formalism explains how the postmodern turn in Estonian art meant more than just a new style of art, it meant "a new way of thinking" and "being sensitive to context".[105]

Contemporary art entered the teacher training programmes through teachers trained in art academies during the 90s, who in Kristin Orav's (2015) terms belonged to the "Winners generation" as it applies in the

—

[99] iE1

[100] iE1; iE6

[101] Annus (2018, p. 239) has shown how these possibilities of "summer-housing" functioned in two, party disparate ways. They were at once a part of the Soviet system where they "functioned through the somewhat illusory feeling of acting according to one's own desires" and something opposing this system, a "political act in Rancière's sense, opening up new sensibilities, extending the sphere of the possible".

[102] iE9; iE11

[103] iE1; iE6; iE9; iE10; iE12; iE13; iE15; iE16; wsE2

[104] iE1; iE2; iE3; iE6; iE7; iE11; iE12; iE15; iE16

[105] iE12

Estonian art world.[106] The ideological transitions that took place during the 1990s favoured young artists who experimented with new media technologies at the expense of more traditional skills and practices that were associated with the Soviet regime. The turn towards contemporary art in Estonian visual arts education as a part of a dominating or "winning" narrative is also confirmed by one of the participants saying:

> For those people who are very insecure about contemporary art, for them it is still a conflict, but for those who have studied and have some idea of what is going on, it is not. So, from one side it is a conflict and from the other side it is just a pity that some people do not let students find out their creativity or play. (*Teacher participant, EE*)[107]

Of the older traditions that in this narrative have stepped back in favour of contemporary approaches, drawing is perhaps the most important for visual arts education. The next section discusses drawing as a cultural technique and how its dominance is perceived by art educators in Sweden and Estonia today.

5.1.2 Drawing as a cultural technique

For art educators in both countries, drawing remains a strong symbol of an outdated conception of their subject, manifested in the name change from drawing to image or art. This shift is associated with a move from an older technical-vocational tradition to a broader subject associated with the ability to express oneself through images, mirroring the old schism between *disegno* and *colore* during the Italian renaissance, where *disegno* was associated with rationality, design and innovation and *colore* with expression, colour and atmosphere (Vasari, 1568). But what is drawing? In what way is it a cultural technique? And how can it be studied as a past educational tradition?

What we call drawing is an embodied technique, based on a certain way of looking at objects from a specific point of view, performed in relation to different media, technologies and materials (such as pencils, paper, slates or computers) that in turn generate new media with symbolic value (such as

—

[106] The notion of a "winners generation" in Estonian society is used to refer to those parts of the population that benefited from the sociopolitical changes in the 1990s (mainly young people), in terms of economy but also more broadly (see also Opermann, 2014, pp. 90–91; Titma, Tuma, & Silver, 1998).

[107] iE6

art, comics or technical drawings). In other words, drawing is a practice "in which media are embedded, that configure media, or that, in a fundamental way, generate media" (Schüttpelz, 2006, pp. 1–2). Drawing also constitutes a "second-order technique" in the sense of a technology that can thematize itself (Macho, 2013, p. 31). A drawing can indeed refer to another drawing or thematize drawing as a practice. Drawing thus comprises a cultural technique in the narrower sense, as a technology involved in symbolic work but also in the more basic sense, as a mode of praxis, something that can be formalized, reproduced and passed on to others (Vismann, 2013, p. 87).

As previously discussed, promoters of a wider definition of the term have argued that there is no such thing as a "culture-less technique": all techniques in one way or another process the distinctions between nature and culture (Schüttpelz, 2006; Siegert, 2013, 2015; Vismann, 2013). Drawing performs this operation quite litterally by flattening the messy reality into two-dimensional inscriptions that can be scaled, reproduced, measured and recombined. It further carries out a specific way of experiencing and ordering the world, by "defining the act of seeing" and, by extension, what is possible to see and to get knowledge about (Latour, 1986, p. 9). A drawing of a tree can, in contrast to the tree itself, be scaled down and flattened to a format that can be handled and moved. It can be combined with other images, such as close-ups on the leaves or a map of the habitat of the tree, and modified to represent the ideal tree. Most importantly perhaps, the image of the tree can be reproduced to consolidate a certain classification of trees defined by a specific way of looking at them.

To study cultural techniques of the past, Vismann (2013) suggests turning to *instructions* "where cultural techniques are performed and mediated independently of persons" (p. 88). In this case, textbooks on art teaching make up such instructions. Produced to support art teachers in passing on the technique of figure drawing, they illustrate how specific ways of seeing the world are reproduced through an embodied technique and how this technique is mediated into images and templates. The images in figure 4 are excerpts from two textbooks on drawing that have been used in Estonian visual arts education. The image furthest left is from the period before occupation, published in 1939 in Estonian language .[108] The second,

—

[108] *Instructions in drawing* (Joonistamis-õpetus) by J. Vahtra.

framed, image is from a Russian textbook published in 1975 that was used in Estonia during the occupation.[109]

The image from the earlier book shows a page with models for the teacher to copy on the blackboard including the proportions of the human body, examples of bodies in different movement and postures and close ups on facial features. These inscriptions of human bodies are flattened and scaled down to fit a book page, in order to be reproduced (printed), moved (distributed to different schools), scaled up and reproduced by the teacher on the blackboard and then scaled down again by the hand of the student to slate or paper, and all this without losing proportions or being modified. The image from the Russian language textbook shows a spread with different templates of symbols and objects. According to Estonian art education historian Eve Kärner (2006), school art education during this period was characterized by the depiction of flat items such as flags, books and geometrical shapes. Even three-dimensional objects, such as the birdhouse and the truck are depicted as flat shapes for the students to copy.

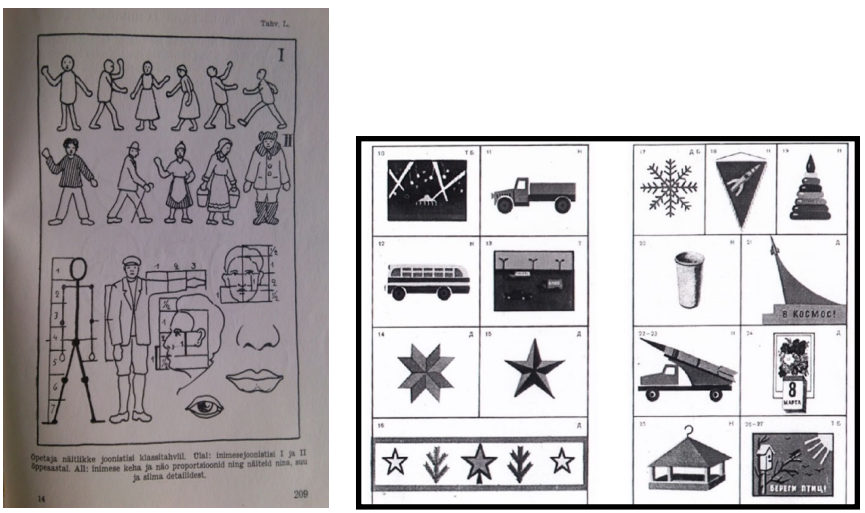


Figure 4. Page from Estonian art textbook from 1939; Page spread from Soviet art textbook from 1975. Photograph: Eve Kärner.

The technique of scaling, for Latour (1986), is the ability to turn the world into "phenomena that can be dominated by the eyes and held by hands, no

—

[109] *Art education in auxiliary school* (ИЗОБРАЗИТЕЛЬНАЯ ДЕЯТЕЛЬНОСТЬ В СПОМОГАТЕЛЬНОЙ ШКОЛЕ) by I.A. Groshenkov. This textbook was especially targeted towards children with disabilities, but follows the same set-up as ordinary textbooks during the period.

matter where they come from or what their original size" (p. 19). From this perspective, it is not far-fetched to read the scaled down human figures in traditional clothes in the Estonian textbook as attempts to represent knowledge about the world – the human body, local culture and history – in handleable and generalizable pieces. As demonstrated by Katie Day Good (2020), such "efforts to neatly organize and display the 'world in a box' have manifested in a range of educational materials from at least the seventh century to the present", and can be understood as an attempt to "bring the world" in to the classroom while presenting it as something that can be mapped and understood in its entirety (p. 16).

Flattening is described by Latour (1986) as a more extreme kind of domination, since in a flat surface "there is nothing hidden or convoluted, no shadows, no 'double entendre'" (p. 19). Following this imperative, the flat inscriptions in the Russian textbook can in turn be understood as implementations of the standardized Soviet school system where "[p]upils were taught final, unquestionable truths, values, and norms in order to develop firm and lasting knowledge based on the communist world-view" and where "[s]yllabi and teaching materials were unified, and where the autonomy and creativity of teachers were strictly limited" (Tuul et al., 2011, p. 763). A flat shape, without room for interpretation or ambiguity, is the perfect visualization of universal, unquestionable truths, passed on through detailed instructions.

Objects cast shadows when they are in a context, but as the previously quoted participant noted, "universal things are not contextualized". Indeed, the images in the 1975 textbook are not only flattened and lack shadows, they are also are presented on a white background, one after another without any interrelations or *context.* As Macho points out, shadow tracing is often perceived as the origin of painting, but also precisely as a way to contextualize and understand time and space:

> The technique of shadow painting (skiagraphy) was very popular in Greece. This technique is intimately linked with the cultural techniques of geometry and astronomy, where the shadow cast by a shadow shaft (gnomon) was retraced and used for measurement (of temporal and spatial relations). (Macho, 2013, pp. 39–40)

Shadow tracing as an early form of painting also confirms the division between drawing and painting (or *disegno* and *colore*). Estonian art historian Eda Sepp (2002) recalls that the state criticism against Tartu Art

Institute that led to its closure in 1951, was partly because the Tatu artists were "modelling with colour rather than line, like in the Soviet tradition" (p. 45). While drawing is associated with the tradition of draughtsmanship and polytechnics in Estonia, the introduction of shadows and the technique of paining can be said to represent contextualization and a turn towards fine art in visual arts education. Paradoxically, shadow drawing is also considered by educators in both countries as an example of traditional or even outdated art education.

When describing old or outdated practices of art teaching the participants in this study, as well as educators active in the online art teacher community, often refer to drawing studies on shadow and light. At the same time as such assignment are very common and considered necessary, they also seem to be associated with past traditions of technical skill training. One Swedish participant laughs a bit apologetically when explaining how she uses "instruction videos that other art teachers post on YouTube" to cover these more instrumental parts of visual arts education, such as "making shadows on a round sphere…. this thing that we have all been doing since the stone age".[110]

The same kind of exercise, training students in observing and depicting how shadows fall on a round sphere, is also discussed by one of the participants in Estonia. After our interview, this educator showed me around the facilities of the school and attracted my attention to an instructtional poster on the wall in one of the classrooms, showing precisely the rules of shadow drawing and the names of the different shadows (fig. 5). For the educator, this was an example of what he had discussed in the preceding interview as traditional or even outdated teaching. The fact that the names of the shadows were in Russian language also made the educator suspect that the template was indeed taken from one of the curricular packages used before 1991, and he jokingly referred to it as "typical Soviet art education".[111]

—

[110] iS9

[111] iE13

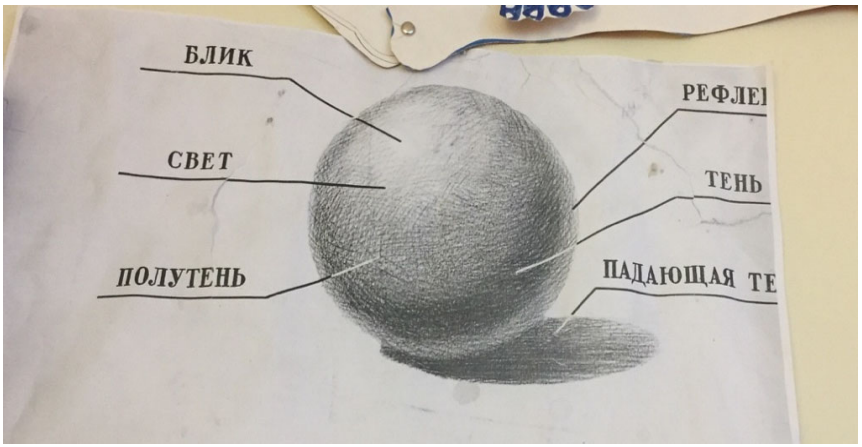


Figure 5. Drawing template from Estonian art classroom. Photograph from site visit.

While many of the participants denounced exercises associated with past subject conceptions, they also emphasized the importance of tradition, and used the past to motivate the importance of the subject. One of the Swedish participants talked about how one important goal with art is "to get access to cultural history and understand that things are connected".[112] Another discusses the importance of old techniques, firmly stating that although new technologies are added, we should be careful not to let older ones disappear from visual arts education:

> I think it [visual art education] will synchronize with the technical possibilities that will exist, but I still think we will play. The question then is, what kind of tools do we play with? That might be interesting to think about, what the room will look like and what we have in our hands. Will we stop painting? No, never! That would be really strange… should we stop writing poetry too? We won't stop doing anything! But maybe we will do *more* stuff. (*Teacher participant, SE*)[113]

The "stuff" referred to by the educator is digital technologies, put forth in almost all interviews as a rupture in the development of visual arts education. The last section of this subchapter discusses this tension between tradition and renewal, and what the participants perceive as the major changes in their subject.

—

[112] iS3
[113] iS4

5.1.3 Links and ruptures

The rupture brought by digital technologies is described by educators in this study both as a way to make the subject relevant for students and as a threat to older, and *slower* techniques, based on the knowledge of the hand. The latter position also includes suspicions that digital technologies make students work in a more mainstream way, by "narrowing down creativity",[114] "making everything look the same",[115] "disconnecting people from the world"[116] and "imitating your thinking".[117] One participant in Sweden also connected the digitalization with what she perceived as an over-theorization of visual arts education, stemming from the emphasis on semiotics and interpretation, and argued that analytical abilities must be included in the practical work instead of through reading and writing:

> I think visual arts education makes a big difference for many students and creates the ability to develop empathy and the ability to participate in a democratic society. From being able to create with your own hands, having the self-esteem to… just create, make something, have an idea and put that into a finished shape… the learning of the hand. When they sit in front of their computers and type, they become very passive, but to be able to build a three-meter-tall papier-maché statue… that has a point when it comes to expressing yourself in the room. One risk with visual arts education, that we see happening in all the aesthetical subjects, is that they become very theoretical. If we are to involve image analysis, the kids sit and write for four to five lessons a semester. With forty minutes a week, we don't have time to write, the analysis… the development of the analytical abilities must happen through the practical work. We cannot abandon them here! Everybody has to be able to cut kind of straight. Those basic things are really important. (*Teacher participant, SE*)[118]

Expressed in this quote is the idea that computers and other digital tools do not develop knowledge of the hand in the same way as analogue techniques do, and also that the mastering of basic cultural techniques such as using scissors is necessary in order to develop into a responsible human being and citizen. A similar demur is put forth by other educators, saying that "art teachers are not against bringing technology to class, but it cannot take

—

[114] iE3
[115] iS4
[116] iE5
[117] iE1
[118] iS1

away the *unmediated* way of creating, the motoric of the children's fingers"[119] and that digital tools are more automated, "just to push a button".[120] Another participant, who believed that the potential of Bildung within visual arts education was directly connected to techniques of the hand, describes how older cultural techniques are sometimes also associated with outdated and romantic ideas about art and art making, and how this "romantic accusation" limits the discussion around the bias of different media.[121] Others still put forth digitalization as a way to combine cultural history with contemporary art and media education:

> One thing I want to mention when it comes to media is that it was a break in the tradition of arts education, to develop media education as a part of the subject. I like to combine traditional working methods and then put them into a media production context… like putting their individual images into a narrative. That also made it easier to see how the context or the framing of an image changed the meaning of it, and to allow for new sources to come in. It became a practical way to work with theories of visual communication and visual culture. (*Teacher participant, SE*)[122]

For this educator, theories of visual culture became a way to combine cultural history with contemporary art and digital approaches, "a battery of methods for examination and knowledge forms that I think schools could benefit enormously from", and also a development of the semiotic perspective introduced in Swedish visual arts education in the 1970s. Contemporary art, explains the educator "addresses societal questions, identity, power and all kinds of visualization techniques" and as such neatly manages the political heritage in Swedish arts education by shifting focus from "leftist rhetoric" to identity politics "such as gender, norm critique and so on", as put by another participant.[123]

The concept *visual culture* is also mentioned by several other participants in discussing the aim of their subjects, not least in relation to digital technologies.[124] Some also bring up the limits of the concept because it "singles out the visual in an unfortunate way" as one of them puts it, referring to art making practices as including other senses as well, not least

—

[119] iE13
[120] iS9
[121] iE5
[122] iS3
[123] iS4
[124] iE1; iE3; iE5; iE11; iS4; iS5; iS7; iS10; wsS1; wsE1; wsE2

touch.[125] In the Swedish context, this bias towards the visual is also present in the name of the subject, *Bild* (image, figure), introduced to frame arts as a communication subject rather than as skill training, but for some participants too oriented towards visuality. One of the workshop participants said: "In general, the name 'bild' makes it kind of narrow. If it was called 'art' or 'art and communication' you would look at it differently I think".[126] [127]

The emphasis on visuality does indeed point to a dominance of sight in our culture, expressed not least in language where we speak about cognitive capabilities as "gaining perspective" and about experience as to "see for ourselves" (McLuhan & Fiore, 1967, pp. 68, 177). But visual culture, argues Latour (1986), should not be understood only as a culture dominated by images and sight. It is rather a way of ordering knowledge, grounded in cultural techniques that demands thinking "with both eyes and hands". The start of this visual era can be derived back to the invention of the linear central perspective that offered a certain "optical consistency" to visual representations of the world, through which object could be turned, moved or scaled while staying the same (Latour, 1986, p. 7; Siegert, 2015, p. 123). When objects can be moved, they can also be mixed and altered, as seen in the previously discussed example of the art textbook.

Some of the educators in the study do use visuality in this broader sense, as an approach and a form of knowledge rather than as a limitation of techniques for perceiving the world. Others maintain that art education should be focused around the visual because of the visual bias of our culture, and further use this as an argument for why visual arts education is such an important school subject. What we can see here can be understood as a tension between *visuality* and *vision,* where visuality is a way of producing knowledge, not only in arts but in science and engineering too, and vision is the human sense extended and prioritized by certain technologies. Where Latour talks about visuality, McLuhan (1967) is more interested in vision, and how mechanical technologies such as the camera prioritize the knowledge of the eye over that of the hand. In the arts, it was "in an age of photography the divorce of the visual from the interplay of the other senses

—

[125] iE5

[126] wsS3

[127] A similar discussion took place in one of the discussion groups on Facebook for art teachers in Sweden, where a member posted a reflection based on a question she got from a student about how architecture, film and three-dimensional work relate to the term "bild" (image, figure). The post was soon followed by forty-three responses where art teachers suggested new names for the subject including "art", "art and culture" and "visual culture and communication".

was pushed all the way into reaction" (p. 81), he writes, arguing that as a result of technologies extending our vision, arts and imagination as such have become connected to *sight*.

In his exposition of how imagination has been treated in media theory, Young (2017) shows how Kittler inverts this idea of "media as an extension of man" into "man as an extension of media", thereby emphasizing how human imagination is delineated and structured by media technologies (p. 23). This is also recognized by the art educators in the study, but in terms of relationality instead of structure or limitations. "Drawing and thinking is connected" states one participant.[128] Another one talks about "a unique relation to a material or a field".[129] and a third about visual arts education as taking place in "relation to materials, but also in relation to others and in relation to context".[130] One participant elaborates specifically on the relation between imagination and materiality by saying: "Learning a material becomes a part of developing imagination. New experiences with materials make you imagine new things".[131]

The idea that handling media and material is a way of thinking, is further explained by another participant, discussing how a camera can be used to understand precisely how vision works. She describes an instance of playing around with a camera and by chance discovering how reflection functions on different surfaces. For the participant, this led to a project that could not have been thought of in advance or understood theoretically prior to experiencing it through the camera:

> This was a discovery, and it was not because of me, but the camera caught something that I had not seen or thought about. When I discovered it, I started to play with it, moved around and tried to make it appear as many times as possible in an image. This is an aesthetical learning process, that you discover things that you would not have discovered in the same way without a camera in your hand at that point… you can only see it in this way, you cannot think it out. (*Teacher participant, SE*)[132]

Another art educator describes working with digital sculpting and virtual reality (VR) in the classroom, and how these techniques meant that the students had to rotate their three-dimensional objects in the digital space to

—

[128] iE14
[129] iS3
[130] iS5
[131] iS4
[132] iS6

see if they hung together, rather than using their hands to shape them as they would have done with clay: "Normally you do that with your hands, but you need to learn to do it this way… if you add things to a shape, you need to make sure they stick, and don't end up on their side". In a second step, the digital objects could be imported into VR environments, that are possible to move around in and to take screen shots or make movies of, offering what the educator enthusiastically describes as "a new dimension of looking".[133]

In these stories, the participants talk about *seeing*, but also about *moving around* and having a camera in *hand*. In the first account, these aspects are posed against thinking, but also about the seeing performed without a camera. The camera very concretely extended the vision of the person taking the pictures, and also offered a way of thinking about those pictures, performed not only cognitively but also by moving around and using their hands to snap pictures whenever an interesting reflection appeared. The thinking took place with eyes and hands, camera and body. The second account shows how digital technologies do emphasize vision over the knowledge of the hand, but also how this bias is made visible through the new thinking required in order to understand three-dimensionality in digital space.

Rather than a rupture, it might be fair to talk about an *increasing shift towards visuality in image making*. Older cultural techniques, such as indigenous painting or working with clay, are prior to what McLuhan perceived as a separation and elevation of the visual in art making, whereas mechanical, and indeed digital technologies, explore precisely this form of knowledge. But digital technologies also differ from their predecessors by an increased invisibility of the processes and materialities involved in the mediation of vision. Using cameras as an example, they are based on the same technological principle whether analogue or digital: light reflected onto a photosensitive surface, but the choices you have to make to take a properly exposed photograph with an analogue camera is automated, and thus obscured, in the digital camera or smartphone.

For some participants in the study, this automation meant an opportunity to work fast and concentrate on other things than the technological process, such as narration or composition.[134] For others, it meant a more limited understanding of what photography is and a less reflective practice,

—

[133] iS12

[134] wsS1; wsS2

or as put by one workshop participant: "Old technology makes you think more".[135] Implicit in this statement is that old technology not only makes you think *more*, but also that it makes you think *about other things* than the motive. In photography, it includes such aspects as light, movement and image depth. Another participant expressed a similar idea about drawing, saying: "It is not about this special technical ability, it is about… the attentiveness, this ability to lead your attention and to keep it".[136]

From this perspective, the persistence of shadow drawing exercises in both Estonia and Sweden can be understood as exercises in seeing and paying attention to light, shape and texture. At the same time, based on the discussions of visual culture and different ways of seeing, the coeval antipathy against such exercises could be read as a resistance towards a *specific* way of seeing and experiencing the world, associated with past traditions in the subject. Traditions are, however, not only kept up by individual teachers, they are also part of a more inert school culture, materialized in built infrastructures and art classroom technologies. This very concrete link to past subject traditions is discussed in the next subchapter.

5.2 The art classroom as an archive

Anyone who has recently spent some time in an art classroom knows that they tend to become archives of image making technologies. Old or even ancient techniques such as paint and clay are put side by side with computers, tablets and cameras. Obsolete technology is used, put away or repurposed but seldom thrown away. Darkrooms for analogue photo printing are used as storerooms and etching presses are turned into tables. Indeed, the art classroom can be understood as a materialization of what visual culture researcher Kevin Tavin (2005b, p. 16) refers to as the *palimpsest of art education*, where the past is both erased and present at the same time. In this respect, the art classroom is the perfect space for practising *media archaeology*. This chapter does not perform media archaeology as "meticulous research into non mainstream-technological and mediatic apparatuses" (Parikka, 2012, p. 13) in order to excavate forgotten or alternative media histories, but rather uses the concept of the archive to discuss how media technologies and cultural techniques from different times are used *simul-*

—
[135] wsE2
[136] iE6

taneously and *consciously* by educators in the present to maintain, combine and challenge different art educational traditions.

However, it is not only the inside of the classroom that displays something about how education has been perceived and practiced historically and how teachers negotiate this past. As discussed in the methods section, the architecture, placing and planning of school and university buildings could also be seen as materializations of educational imaginaries, and be excavated not just for past traditions but also for the future visions from this past. The first section in this subchapter presents 1) a mapping of this relation between architecture and past educational imaginaries, followed by 2) a discussion on how the past manifest itself within the classroom through technologies, materials and student work, and the role of teachers within this context, as mediators and negotiators of tradition and as media archaeologists in their own right.

5.2.1 Architecture as memory

As discussed in chapter four, the design of classrooms and school buildings is closely linked to prevailing ideas of education and to teaching practices. The mass education and simultaneous teaching of the 1800s was facilitated by means of big classrooms, desks facing the teacher and individual slates or papers. However, it was not until in the middle of the 1900s that the relationship between architecture and educational practice became explicit and eventually linked to the formation of future citizens (Kirkeby, 2006, p. 27; Skantze, 1989, p. 8). In a Swedish anthology about school architecture, architect Anna Törnquist writes about her view on the school building and the classroom:

> Society is facing great future challenges, and the first two chapters in the national curricula provides a guide on how to meet those challenges through good education of children and young people. Our traditional classrooms, however, are designed for another kind of long-gone social order and are ill-fitted to meet this future. (Törnquist, 2017, pp. 37–38, my translation)

What this quote shows is the intimate relation between educational imaginaries and infrastructures, both hard infrastructure, such as the classroom, and soft ones like curricula. It also reveals how school buildings as such can become memories of past traditions and "long-gone social orders". In Estonia, where visual arts education used to be taught as theory-based art history in the older grades, this is visible in the setup of the classrooms that

are often ill-equipped for practical work, with limited space to store work and no access to water.[137] In primary school, the rooms are often designed for the subject *drawing* and not set up for digital work, and computers are often located in a computer classroom separate from the art classroom.[138]

When it comes to the university institutions training art teachers, none of the institutions visited in Estonia or Sweden were built for this purpose. This means, that the sociotechnical imaginaries embedded in these spaces not only relate to educational imaginaries from a different time, but also to a different discipline or activity. The art teacher training institution in Tallinn University was originally built as a defence school, but later hosted physical education teacher training, and the corresponding institution in Tartu University is located in a former biology department that also served as a biology museum for a period. During the time of the field work, the Estonian Art Academy was temporary relocated to different buildings in the city due to renovation work. In Sweden, Konstfack moved all their programmes to an old factory building in the outskirts of Stockholm in 2004, and the art education department in Södertörn University is placed in a hallway alongside regular seminar rooms.

Although adjustments have been made to fit the new departments, such as installing running water and sinks, many things have been kept as a reminder of past uses, such as the concrete floors in the Konstfack factory building or the anatomical theatre in Tartu University. The original thought and purpose of the buildings were perceived as important for the participants, not least when it comes to creating "an atmosphere of what has been here" as one participant put it.[139] However, the repurposing of spaces also has practical implications and some participants complain that the fact that the space is not originally intended for art making practices limits the possibilities of what the educators and students can do there.[140]

The current practices of splitting up departments between different buildings, as in the case of the Estonian Arts Academy, or sharing facilities with other departments were also considered problematic. "It makes me feel helpless when I have a class in another part of the university, and they have these rows of tables and chairs… I can't stand it" explains one of the teacher educators.[141] During a video walk, another participant shows me an art

—

[137] iE1; iE4; iE16; wsE1

[138] iE3

[139] vwE4

[140] vwS1; vwS2; iE16

[141] iE1

classroom that she describes as a compromise. Having tables placed in rows facing the teacher is not ideal for visual arts education, but is a consequence of the fact that the space is shared with other educators with different needs.[142] Participants also brought up the difficulties of creating a culture where students can stay after class hours to keep working and collaborate or discuss with each other, when they do not have a building or even department of their own, but have to adjust to the demands of flexibility of the modern university.[143]

Although old buildings are appreciated by the participants for their atmospheric qualities, they were also considered problematic in relation to the introduction of digital technologies. One of the participants described these difficulties as a "gap between old and new technology", explaining that the electric systems in old buildings are not designed for the number of digital devices used in contemporary education, and that the walls in old school buildings are sometimes too thick to use Wi-Fi.[144] Some of the problems associated with the introduction of digital technologies are also connected to the organizational changes in more recent history. As discussed in the previous chapter, the reorganization of the educational system in Sweden in the 1990s left decisions about what systems and hardware schools invest in up to the municipalities where it was often handled centrally, without taking local requirements into account. One of the participants explains:

> The whole educational system is crammed with digital tools that are pushed in from above by what I call gurus with different agendas, some just to make money. They claim that it is developed in line with the curricula and so on, and then there is a bunch of people on the ground who are wondering, frankly, "what the fuck is this?" [laughs] /…/ The municipalities do not have the ability and competence to deal with this. So, one important argument is that the schools should go back under state administration again. (*Teacher participant, SE*)[145]

In Estonia, where school digitalization is driven mainly by state and industry funded projects, some participants express a similar frustration. One participant use the term "snowball" as a metaphor to describe the hype surrounding digital technologies in Estonia, something coming from above,

—

[142] vwS3

[143] iE2; iE8; iS4; iS5

[144] wsE2

[145] iS12

that is spinning faster and faster and considered more and more important in the educational debate. Similar to how the shift to municipal governance in Sweden is used as an explanatory model for the problems associated with school digitalization in Sweden, the past is used by this Estonian educator to contextualize what she perceived as top-down implementation of educational technology by jokingly describing the situation as being "worse than Soviet times".[146]

Digital technologies are also connected to architecture by being designed based on assumptions on how the classroom and the teaching is organized. Many of the platforms and learning management systems use the metaphor of the classroom in their products and have implemented many analogue control and transparency systems in their design, such as digital bulletin boards for expected outcomes and assessment criteria, and portfolio systems where students can display their working processes.[147] While these functions reflect a goal-oriented and self-governing school culture, other technologies are based on far older traditions.

One such example is the document camera projector that allows teachers to enlarge and project analogue objects, texts and images placed under the camera, and display detailed techniques in real time. While ordinary projectors are, indeed, based on traditional classroom design where all students face one spot, usually occupied by the teacher, the document camera projector with its possibility to display artistic techniques in real time prioritizes simultaneous teaching resembling those practiced in the 1800s. One workshop participant explains: "If you want to fold something, like origami, they could all do it at the same time which is really useful".[148] Another example of contemporary technologies facilitating simultaneous teaching is the slate apps, developed to make students able to write down the answer of a question on their individual tablets and display them simultaneously to the teacher in the front, much like how individual slates were used in the early public school.[149]

—

[146] iE3

[147] iS3; iS7

[148] wsS4

[149] The difference between the simultaneous drawing classes taking place during the 1800s and today, is that the teacher no longer has to do a big drawing on the board for the students to see properly. Regular projectors have further taken over much of the writing on the black board, and in arts education the practice of making backdrops and scenery for school plays has also to a large extent been replaced with projections. In this sense, digital technologies have replaced one of the skills associated with the teaching profession and led to a lost sense of scale in the classroom.

Visual arts education is, however, not limited to the classroom or the school building but also includes other buildings with an art pedagogical mission, such as the museum and the art hall. In the Estonian national curriculum (2014a) it says that "field trips to museums and art galleries provide the basis for understanding both art history and contemporary art" (p. 20). Following the logic of e-Estonia, museums and other heritage institutions in Estonia are currently making their collections available online (Pruulmann-Vengerfeldt, Runnel, & Aljas, 2013). To get in contact with important works of art or contemporary exhibitions does not demand an actual visit to a museum, meaning that museums can, in theory, also be used as a pedagogical resource for schools located far from the big cities.[150] For the participants in this study, however, the museum as a physical place remains important. Field trips to museums and galleries are not only about looking at art but also about getting access to public commons and becoming acquainted with what art historian Carol Duncan (1995) refers to as the *rituals* of the museum, and that includes moving in a certain way, stopping in front of works and talking in a low voice, but also knowing your way around and feeling at home. One of the teacher educators, who emphasized the importance of museum visits in teacher training, explains:

> We don't look at that many works but only a few, to get this feeling that "this belongs to me", to get this familiarity… everything from knowing where the toilets are to where you hang your clothes… all of this is important! Only about a quarter of our students had been there [at the museum in question] before, and of this quarter, half of them had been there with their school or workplace. Very few had been on their own. So, it is about getting familiar with the public art sphere. (*Teacher participant, SE*)[151]

For this educator, feeling at home in public museums is especially important for future teachers since it will be a basic necessity for them to use museums and art galleries as a pedagogical resource in their profession later on. This possibility is, however, mainly reserved for schools located in urban areas, not least in Estonia where all bigger museums or contemporary art galleries are located to Tallinn or Tartu. The rural schools are often

—

[150] See Good (2020, p. 34) for a discussion on how this idea of visual technologies as compensating first-hand experiences can be traced to the Enlightenment era where cabinets of curiosities and magic lanterns were used to experience foreign counties and cultures.

[151] iS5

limited to visits to local museums or folk-art centres that do not display contemporary art. As one participant puts it:

> The sadder occasions are when people come from small cities or even villages and they have only visited their own… kind of small-town cultural house or whatever there is, where they have seen some flowers painted very realistically or naivistically… and that's it! (*Teacher participant, EE*)[152]

In addition to limited access to cultural institutions, schools in rural Estonia are also often small and have very few students, which in a minor subject like art means very few teaching hours in a week. Under these conditions, the schools are unlikely to find a trained art teacher, and the art classes are often managed by the class teacher or a teacher in another subject, whereas university educated art teachers go to work in urban areas and extracurricular art schools.[153]

Pedagogical traditions are, however, not only maintained by housing facilities, access to cultural institutions and teachers' educational background, but also through the equipment and furnishing of teaching spaces. One example is the abundance of plaster figurines and other still life objects that can be found in all the Estonian art classrooms and art education institutions visited during the field work, as traces of the academic tradition (see fig. 6). In many cases, these objects were pointed out to me by the participants as examples of what they considered traditional, or even of outdated teaching practices (much like how the previously discussed template for light and shadow drawing was pointed out by one participant as an example of how the memory of Soviet academism quite literally sticks to the walls). At the same time, these objects were not stored away or discarded but remained on display in the art classroom or institution as a living memory of past traditions, reflecting the attempt to create a specific art classroom atmosphere.

—

[152] iE6

[153] iE1; iE4; iE11; iE13

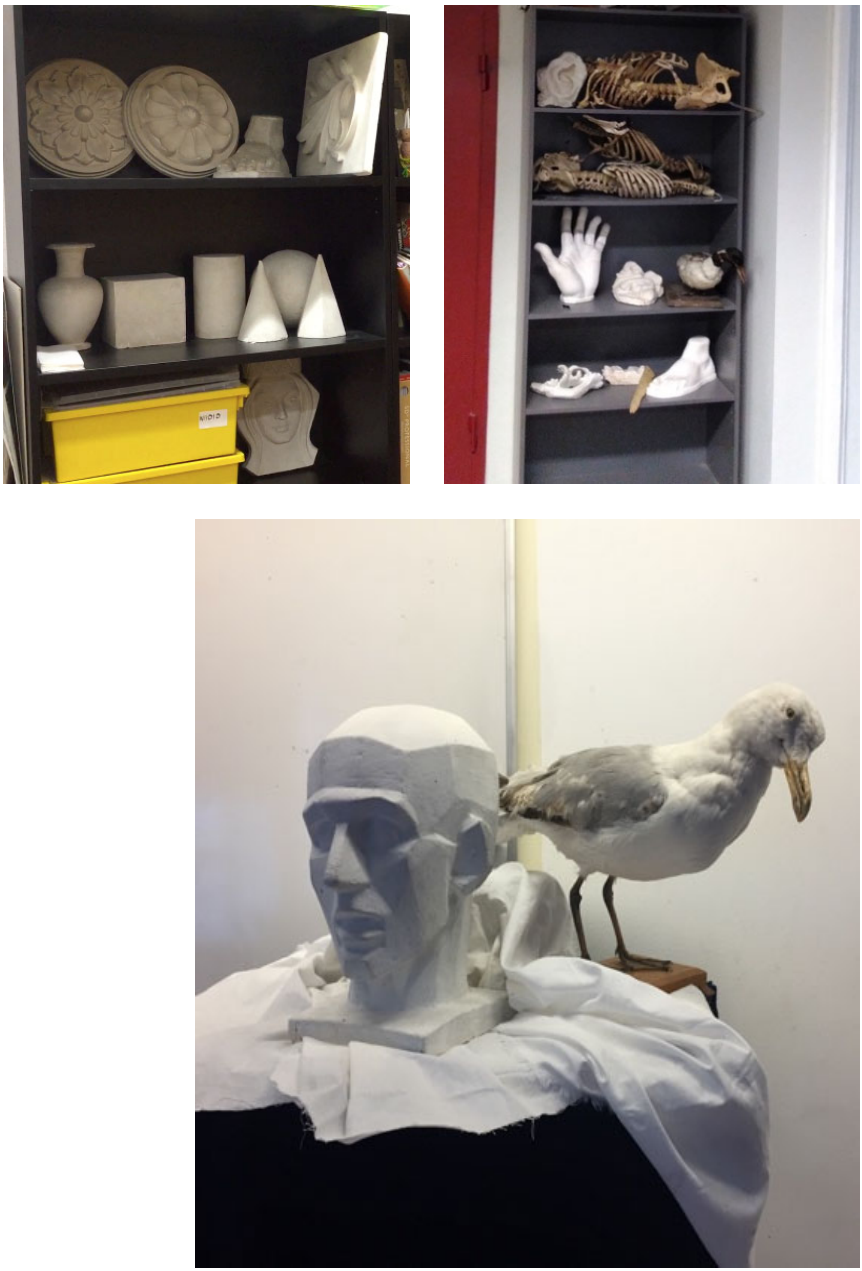


Figure 6. The art classroom as an archive of past subject traditions. Photographs from site visit and still from video walk.

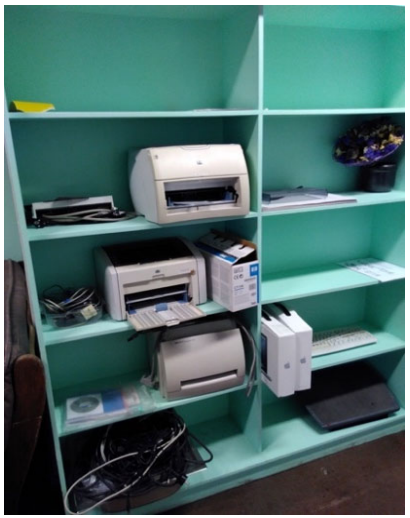


Figure 7. The art classroom as an archive of obsolete technology. Photographs from site visit.

The remnants of old technologies and teaching materials also show the disinclination shared by most art teachers to get rid of things that might come in handy at some point. A look around in the storerooms and corners of an art classroom or institution often reveals an abundance of old, mechanical technologies for making and showing images: printing presses, televisions, computers, printers, projectors, dark room equipment, video players, still cameras, movie cameras and more (see fig. 7). Obsolete technologies are put away and brought back, forgotten and rediscovered, defamed, loved and repurposed. In other words, they constitute the object on which present subject conceptions are written and rewritten in a very concrete illustration of the *palimpsest of art education* (Tavin, 2005b). The last section of this chapter discusses the role of art educators in this process of maintaining and negotiating past traditions within the subject.

5.2.2 Art teachers as institutional memories and media archaeologists

> When I come into an art classroom, I see kind of immediately what kind of art education that is going on… what is on the walls. (*Teacher participant, SE*)[154]

The teacher educator quoted above refers to experiences of vising art classrooms where students are doing their work placement. By looking at the artwork of pupils and the art posters on the walls, the educator explains that she can quickly get an idea of what kind of teaching that is going on and what subject conception and art canon is dominating in that school or classroom. According to the educator, there are big differences between how visual arts education is interpreted and practiced in art classrooms throughout Sweden, with an overrepresentation of skill training and male, modernist art but also including more conceptual approaches. The participant describes the current situation as "a mix of all three paradigms really", referring to the previously discussed narrative of a technical, a psychological and a communicative tradition within Swedish visual arts education. She further explains that because all traditions are still around, students can relate to them using their own experiences from compulsory

—
[154] iS3

school art education and take this as a starting point to develop and re-invent the subject:

> I have also been cautious to talk about these subject traditions, the technical, the mimetic… and all students recognize this. "How many of you have done central perspective?"… 100 percent. "How many have done it several times?"… 100 percent. Like that, they recognize this very well. And then this more psychological… that you are supposed to *feel*, it should come from the inside. "Paint a feeling" and "paint to music" and all these things… and then we start talking about the present, what do we do, how should we think to problematize and make the subject communicative, and to overcome this skill training? (*Teacher participant, SE*)[155]

For the art educators in this study, especially in the Swedish context, knowing the historical development of the school subject is a central part of the profession, and an established part of the art teacher training. In the above example, the past is used as an antitype, something that should be overcome in order for visual arts education to fulfil its potential as a communication subject. Others use the past as a model for a less fragmented school system where the knowledge of the hand is not limited to the arts and crafts lessons. One educator brings up the position of drawing in the early teacher seminars in Sweden, where in order to become a teacher in the first public school, applicants had to provide work samples to show that they had basic drawing skills. For the educator, this indicates an understanding of visual knowledge as an important, that she believes is missing from contemporary teacher training. In response, the educator suggests that a course in visual culture should be included in the modules for general educational science and practice that all teachers read, "because it is such an important knowledge for all teachers" as she puts it.[156]

The past is also used to motivate and make sense of present educational imaginaries. Participants argue that communicative and media related skills that are now highlighted as something novel, both in visual arts education and across the curriculum, are in fact what arts have always been about.[157] One of the Swedish participants discuss the writings on digital competence in the revised national curriculum, complaining that visual arts education is not included or highlighted there, despite the fact that critical image

—

[155] iS3

[156] iS7

[157] iE8; iS11; iS12

analysis has always been part of the subject: "In the new curriculum, for example, source critique is part of social sciences… but we have always done that!".[158] In short, participants in this study understand *visual arts education as always already being about communication and media* in a broad sense. As summed up by one educator:

> Art is, in a way, a place where different things meet, and through art we can enter very different fields much more easily. So, art should be joining or connecting… or it should have this connecting quality, not just a picture on the wall. Art used to be what connected us to the world… communication really… and it should become that way again. (*Teacher participant, EE*)[159]

By functioning as a mediator of this history and as institutional memories, art educators themselves – especially those training new teachers – are important parts of the art educational infrastructure. "If you can look back, you can also look forward" as one of them puts it.[160] But educators are also carrying on traditions by reproducing the training they got in school or at university, not least when it comes to traditional techniques. One educator, who teaches a class in drawing for student art teachers, reflects on how drawing as a cultural technique in itself seems to reproduce a very strict academic approach to art. The educator recalls colleagues (going through the work of her students in capacity of a grading committee) having accused her of "not teaching them [the students] anything" because some of the drawings did not follow the academic tradition of correct proportions and perspective. Despite teaching and practicing contemporary arts themselves, the committee could not apply this approach to drawing but turned to their own educational background where drawing was the dominant technique:

> The commission always remarks on mistakes. I am very surprised because they themselves are so contemporary and do interesting work in their courses, but in mine… it's strange, but they start to think in this traditional way. I think it's some kind of memory of how they have been taught in drawing, in the academy. (*Teacher participant, EE*)[161]

The teacher herself maintained that the academic tradition could not be upheld with the amount of teaching time available today, but also because

—

[158] iS12
[159] iE8
[160] iS3
[161] iE7

drawing needs to be "meaningful, not mechanical". At the same time, she emphasized the importance of skills and pointed out that she *does* include technical know-how associated with academic drawing such as proportions, directions and movement in her teaching practice, but that it is not the main purpose of the assignments. In this case, it is not about reproducing the academic tradition but about renegotiating it and making it fit contemporary practices.

Below are two other examples of such renegotiation of past traditions (fig. 8). The first picture shows a collage of several individual student projects. Each cut-out on the board is a traditional light and shadow drawing study combined with a hand drawn character. The assignment combines the skill training associated with academic drawing with a communicative dimension through putting the spheres in a context, thereby constituting a sort of tongue-in-cheek preservation of the Soviet academy tradition. The second image is a photograph of a wall exhibiting acrylic paintings by pupils on the theme "autumn harvest" – a very typical topic in art competitions or method material during the Soviet era.[162] For the art teacher behind the assignment, this choice of theme also makes up some kind of hidden joke on the expense of past traditions because, as put by the educator, "they [the pupils] are not at all aware of this tradition".[163]

Figure 8. Revisiting traditional techniques and motifs: light and shadow drawing; autumn harvest. Photographs from site visit.

But art teachers are not only revisiting techniques and motives, they are also engaging with old media technologies. As previously discussed, the use of

—

[162] iE13; iE15

[163] iE13

old technologies is associated by the participants with an increased awareness and attentiveness during the creative process, but experiences of working with old or obsolete technologies can also provide new ways of seeing art historical images. One educator recalls noticing that her students reflected more over the choices made by the photographer and the copyist after having worked in the dark room themselves. "Those people who have processed images by themselves, they can understand that black and white photography doesn't only refer to old times or to their grandparent's childhood", the educator explains, but also to grayscale, light and darkness and how these aspects are used to create meaning in a photograph.[164]

Old media technologies are also used by educators to understand contemporary technology. One participant describes using flip books as a way to explore animation technology with younger children, another one suggests building a camera obscura to understand the principles behind photography.[165] Indeed, using old photographic techniques to understand the principles behind digital photography seems to be a very common approach in visual arts education both Sweden and Estonia. At the same time, dark rooms are disappearing from the schools due to lack of space and resources, as discussed by this participant:

> When I think about it, it was also easier for them [the students] to understand [digital photography] when they worked analogue. Not least through the developing process, with shutter speed and aperture… it is the same and you understand that it is light that falls on a medium, and that there is a mark. I have thought about that now when many schools have taken away their dark rooms, how you should design your photo lessons to make them grasp that. I thought about taking an analogue camera apart and lighting it with a flashlight in order to show "this is how it works". (*Extract from workshop, SE*)[166]

Expressed here, is a sensibility not only for the way that new media remediates old media (Bolter & Grusin, 1999) but also for how "media histories are deeply 'networked' with our urban and architectural histories (and futures)" (Mattern, 2015, p. 102). The participant recognized digital photography as a remediation of analogue photography, but also how the mechanical operation is obscured in digital devices. She further emphasizes

—

[164] iE6

[165] iE3; iS2

[166] wsS1

the dependence of analogue photography on the dark room as an architectural space and discusses how to facilitate photography teaching in the future when these spaces tend to disappear with the advances of more flexible housing solutions in educational institutions. The suggestion to dismantle a camera and light it with a flashlight to show the principles behind photography is an example of how visual art educators are using old techniques and technologies, not only to reproduce and negotiate past traditions but also to understand and make visible contemporary media logics and established conventions, by using media archaeology as "a method for artistic engagement in present-day media culture" (Parikka, 2012, p. 136).

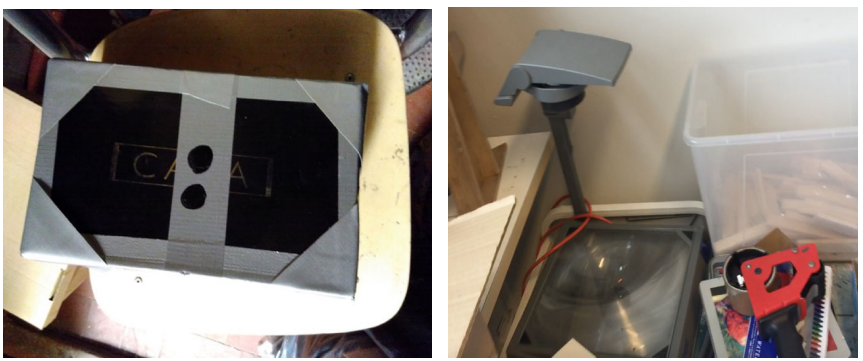


Figure 9. Media archaeology in the art classroom: pin-hole camera and overhead projector. Photograph from site visit and still from video walk.

Media archaeology as an artistic method differs from other approaches to media history by being hands-on, explorative and open-ended and staying open to the unexpected (Goddard, 2015; Parikka, 2012, pp. 136–141; Zielinski, 2006, p. 28). Visual arts education, as a creative and explorative subject, centred around contemporary, visual (media) culture, positioned in what can be conceptualised as archives of old technology does provide the perfect set-up for this approach. The image above (fig. 9) shows two other examples from the field visits of old technology that has been "excavated" and repurposed in creative work: a handmade pin-hole camera (used for artistic experimentation and exploring light, rather than as a documentation technology), and an overhead projector (used to transfer or enlarge drawings onto a wall or big canvas, rather than as a lecture aid).[167] This repurposing and hands-on engagement with technologies is connected to a

—

[167] vwS2

certain sensibility to material, architecture and environments. This quality is discussed in the following chapter as *infrastructural imagination*.

5.3 Summary

- This chapter discusses the relation between cultural techniques used in visual arts education in Sweden and Estonia and the historical development of the subject.
- The emphasis on different cultural techniques in visual arts education is traditionally connected to certain visions of what the subject is about and what kind of subjects it should produce: as a technical subject, it was meant to prepare children for working in industry and also to develop general life skills, and with drawing it reproduced a certain way of seeing and perceiving the world.
- There has been a shift in the perception and conceptualization of visual arts education in Sweden and Estonia, from an emphasis on cultural techniques to visual content. This shift is manifested in the name change from drawing to image in Swedish and from drawing to arts in Estonia.
- The participants in this study understand the implementation of digital technologies as a similar rupture between the knowledge of the hand and cognitive skills. This rupture can be questioned on the basis of digital technologies as also constituting cultural techniques that thematize vision and visuality.
- Tradition comes across in the material as more important than curricula, manifested and reinforced by geographical conditions, institutional architecture and classroom fittings.
- The participants in this study use these materializations of the past to motivate and develop visual arts education, by working with and thematizing older cultural techniques.

CHAPTER 6

The infrastructural imagination of art educators

The previous chapter discussed how art educators make use of past traditions to make sense of and develop visual arts education in a perceived shift connected to the introduction of digital media technologies. The chapter further argued that this historicizing perspective is made possible because past traditions are materialized and kept in the art classroom as techniques, technologies and genres that can be utilized by art educators to thematize visual arts education and its traditions. This demands a certain sensibility towards the relation between environments, media and educational imaginaries that is developed in this chapter as a central part of the art teacher profession.

As noted above, visual arts education differs from most school subjects by being a rather small but compulsory school subject, meaning that art teachers often tend to meet far more pupils every week than most teachers do. It is also a subject dependent on certain infrastructural conditions, such as access to light, running water and a variety of technological equipment for image production. Meanwhile, classrooms and digital infrastructures are designed for a smaller number of students and other kinds of practice. In other words, art educators are often operating in infrastructures that are designed for a different population and where their specific needs are not taken into account.

In the classroom, this creates seemingly mundane but crucial problems such as where to store the material produced by the students, how to start up and organize the cleaning up after a class, how to keep material and tools sorted, in short; how to create durable working routines with big classes and short lessons. Such problems are often solved by educators through hands-on *infrastructuring* (Bowker & Star, 2002; Karasti & Syrjänen, 2004; Pipek & Wulf, 2009; Velkova, 2017) such as keeping valuable items in locked cupboards, creating crib sheets on how to access the internet, printers and other digital technologies, or by manually moving things from one place to

another. This kind of work demands a sensibility to how thinking and practice emerge in relation to environments, materials and technologies but more importantly perhaps, *the ability to act on this sensibility*. For Jackson, Edwards, Bowker and Knobel (2007), this is what constitutes an infrastructural imagination:

> The particular quality of thought required to recognize and act on this [sensibility] we call the *infrastructural imagination:* envisioning the fulfilment of functions by linking heterogeneous systems (some new, others yet to be built), including human actors, institutions, and procedures, moving between the technical and the social as needed to achieve (and re–envision) the goal. (S. J. Jackson et al., 2007, para. 25, emphasis added)

Based on expert interviews conducted with teacher educators and teachers, as well as on material from video walks and workshops, the first half of this chapter describes how art educators are making up for insufficient infrastructures for teaching and communication with manual work, such as reorganizing the classroom or creating alternative networks for online collaboration. The second subchapter discusses how this kind of *articulation work* (Bowker & Star, 1999, p. 310; Star & Strauss, 1999; Suchman, 2002), performed to make visual arts education fit into the measurement systems of contemporary education, is related to a dynamic between invisibility and visualization where teachers on the one hand strive to make their work visible and get recognition for their work and, on the other hand, perceive demands on accountability and transparency as incompatible with the creative process.

6.1 The art educator as infrastructure worker

The role of the teacher is one of the most discussed topics in debates about school digitalization and educational technology (Selwyn, 2011a, pp. 116–124). Some stakeholders stress digital tools and systems as an aid for teachers, freeing them from administrative and procedural duties, allowing more time with each student and opening up for personalized learning. Others have a more dystopian outlook and anticipate a disappearance of professional teachers who are being reduced to "data collectors and data entry clerks" (Williamson, 2017, p. 82). Common to these imaginaries is the assumption that digital technology *will* change the role of the teacher, and that this change in one way or another will mean a shift "from sage on the stage to guide on the side" (A. King, 1993). Another assumption is that

digital systems and tools are well functioning and compatible with established systems and practices of teaching.

In a competing vision, teachers can be seen as "the integral human component of a socio-technical system without which that system cannot properly function" (Mateescu & Elish, 2019, p. 13). From this perspective, teachers are seen as those making up for failing or ill-suited systems, and technology as changing the nature of their paid work rather than reshaping the learning process or their roles as pedagogues. By highlighting teaching as an occupation and not as process of knowledge transfer, overlapping control systems and contradicting concerns in relation to digitalization become visible. As put by Selwyn:

> From this perspective, the use of digital technologies in educational institutions should be understood (at least in part) in terms of teachers' ongoing negotiations during the course of their day-to-day work. In other words, we should understand teachers as having to engage in an ongoing process making sense of the various technologies they encounter during their working-day and then fitting these technologies with the 'job' of the being a teacher and, conversely, fitting the 'job' of being a teacher with the demands of digital technology. (Selwyn, 2011a, p. 127)

In this subchapter, the dovetailing of work and digital technology is put on a par with the infrastructuring performed by art teachers in the classroom. Built environments, technical systems and written standards become infrastructure in relation to the organized practice of teachers everyday work, but are also dependent on human labour for maintenance, repair and configureation (S. J. Jackson, 2014; Star & Ruhleder, 1996, p. 113). The concept infrastructural imagination (S. J. Jackson et al., 2007) is used here to draw attention to the tensions and negotiations involved in this process in which existing infrastructures can be repurposed and new infrastructures can emerge.

The subchapter is structured in three overlapping themes, starting with 1) a discussion on the sensibility to logistical qualities of media in the classroom, that precedes 2) the workarounds and configurations performed by art teachers in which they function *as* infrastructure to compensate for inadequate systems, and 3) the informal development of new systems that takes place when established institutions fail to provide sufficient support and the processes through which these alternative systems become institutionalized.

6.1.1 Recognizing infrastructures

> Medium is what you use to mix paint with! (*Extract from workshop, SE*)[168]

The above quote comes from a student participating in one of the workshops about the future art classroom, as a reply to my initial question of how they would define media. Although admittedly most participants first thought about mass media or digital media, the fact that this student associated the term *media* first with *painting medium* points to some important characteristics of visual arts education, namely the ability to recognize the infrastructures needed to facilitate media content. Painting mediums are oil or acrylic based substances used to modify the texture, drying time and finish of paint or to prime a surface before painting on it. While having no content in itself, a painting medium makes it possible for paint to stick on different surfaces, enables detailed work by prolonging the drying time or by making the paint thinner. In other words, a painting medium very literally "prepares the ground" for other kinds of media containing content and messages and hence constitutes what Peters (2015b, p. 37) calls a *logistical medium*.

Without always being articulated as media, other things with similar characteristics soon came up when the educators in this study discussed what they need to facilitate teaching. Rather than tools that can be used to communicate a content, they started with media that organize other media or practices. Among the things frequently mentioned were technologies for transferring images from one place to another, such as the photocopier, the tracing table, the printer and the overhead projector.[169] It is also important how these technologies are placed in relation to the art classroom, as one teacher explains:

> I am very dependent on tracing tables and photocopiers. Now we have copy machines just across the hall, but in one place where I worked, I had copy machines in the classroom and that was great. I use it to enlarge and scale down sketches, and to make copies of sketches that the student can experiment with colours and such on. Because it is so common that the student says they don't want to ruin their images. That's why it is so impor-

—

[168] wsS3

[169] As discussed in the previous chapter, the overhead projector has long since been repurposed from a lecture aid to tool for enlarging images, but old overhead projectors also served as tracing tables in many art classrooms, as did windows and even – occasionally – tablet computers.

> tant for me, we use it every lesson… and then the tracing tables. (*Teacher participant, SE*)[170]

In this sense, the art classroom itself is also understood by the participants as a logistical problem, or even, as Ericson (2019, pp. 229–230) suggests, *a logistical medium in its own right*. For the educator, it was not only the access to photocopiers that mattered, but also how they were placed in relation to the art classrom, revealing a recognition of the emergence of infrastructure in the connection between media, architecture and established work processes. This is also evident in the workshops, where the participants showed great engagement and sensibility discussing issues as how to move around in the classroom, where to put the students' work, how to organize chords, the importance of daylight and blackout possibilities, where to wash brushes, how acoustics works in different spaces and how facilities can be used in multiple ways. In these discussions, they also recognized seemingly mundane media as central to communication, for example post-it notes as supplementing more standardized tools for internal school communication such as learning management systems, or clocks and other media for time keeping as central for the whole idea of schooling.[171] They also discussed the importance of media such as water, light and Wi-Fi, as represented in the images below (fig. 10, see also fig. 26) from one of the workshops:

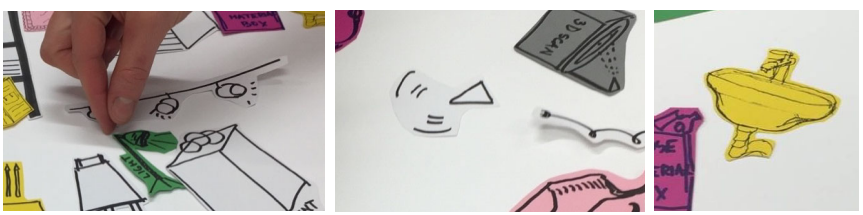


Figure 10. Logistical media: light, internet and water. Photographs from workshop.

Water, light and Wi-Fi constitute logistical media that are used for transmission, logistics or to alter the conditions of work, dependent on established infrastructures (the power grid and the water and sewerage system). Light is used here both to create shadows on objects in drawing exercises, and to light artworks during exhibitions. In other words, both to make environments visible and to facilitate communication through other kinds

—

[170] iS8

[171] wsE1; wsS2

of media, such as paintings, drawings or three-dimensional work. Treating light as medium is in line with the "ontologizing and pluralizing media" (Peters, 2015b, p. 15) associated with medium theory, in the sense that it both expands the definition of what a medium is and emphasizes media as a way of being and experiencing the world rather than as a channel for communication.

In a similar way, Wi-Fi is discussed by the participants as part of an infrastructure emerging in the transfer of images between different places: between the student device and the teacher's computer or printer, from the internet to the classroom or from the classroom to websites or other platforms, making it available for an audience outside school. Water, in turn, is used not only for mixing colour or making clay more malleable but also for cleaning up after these exercises, thus maintaining a functioning working environment. Due to the heavy cleaning performed in art classrooms, that includes cleaning plaster from containers and acrylic (plastic based) paint from brushes and palettes, the participants in the study also showed extensive knowledge and sensibility when it comes to plumbing infrastructure, including septic tanks and water-resistant flooring.

In these discussions about maintenance of the environment, the notion of repair is ever present. When discussing the need for a printer in the art classroom, one workshop participant asks rhetorically "Do you draw the janitor as well?", pointing to previous experiences of malfunctioning digital technologies disturbing their teaching practices, and the need for technical support that follows. At the same time, participants discuss the problems of such professional specialization, arguing that teachers themselves need to be in control of the technologies they use instead of depending on external support services. Another participant from the same workshop explains that the *infrastructure concealment* (Parks, 2010, para. 10) associated with digital tools might explain the hesitance among some teachers to use new technology:

> I think if you get stuck in a book [as in students not understanding the instructions in a textbook] you can solve it differently. Or if you lack some material, you can just go and get it. But with digital things there is just one way, if it doesn't work it is a full stop. (*Extract from workshop, SE*)[172]

Other participants brought up the problem of infrastructure concealment with regards to questions about privacy, dataveillance and commercial

—

[172] wsS2

interests in education.[173] Through assuming a historicizing perspective, one of them points to a different way of thinking about technology development, as driven neither by major companies nor as a DIY project, but as a welfare initiative for the common good:

> I believe that if this technology shift that has happened now, during the last ten or twenty years… if that had happened during the 40s or 50s, during the building of the welfare state, then the Swedish state would have started a company to provide all institutions with technology solutions, to keep commercial actors out. Like with the liquor stores or drug stores… I think so. (*Extract from workshop, SE*)[174]

The idea of a state-run development of educational technology systems aligns with the critique against the municipal management of schools discussed in the previous chapter, where events in recent history are used to explain current problems related to school digitalization. For Star (1991) the understanding that "all constructions are historically contingent, no matter how stabilized" as well as the ability to imagine other kinds of infrastructures is favoured by the position of being both inside and outside at the same time (p. 87). In Star's example, it is women, whose experience of being marginalized in some contexts and included in others, that can bring a "stranger's eye" to certain experiences, but this also applies to art teachers who are both included in the educational school system by representing one of the mandatory subjects, and at the same time excluded by not always being taken seriously or not having their needs fully met.

In this case, the "stranger's eye" does not only offer a historicizing perspective on school infrastructure, but it also seems to make art teachers recognize human labour as part of classroom infrastructure, expressed visually in the maps created during the workshops, as cartoon like drawings,[175] with arrows representing movement,[176] a hand[177] or footsteps[178] (see fig. 11). These visual elements were typically placed in the middle of the maps (or – as in the case of the footsteps – all over the surface) together with representtations of central media such as the water, Wi-Fi and light discussed above

—

[173] wsS3; iS12
[174] wsS3
[175] wsS1
[176] wsE4
[177] wsS3
[178] wsE4

and soft infrastructures, such as the national curriculum[179] or e-learning platforms.[180]

Figure 11. Representations of infrastructure work. Photographs from workshops.

The visualization of the work performed by teachers as an integrated part of the infrastructure points to a profound understanding of infrastructure as a relational concept, operating across categories of the "social" and the "technical". In this sense, the ability to navigate infrastructures can also be discussed as a kind of tacit knowledge, or sensibility, as put forth by Jackson et al.:

> But if infrastructure can be usefully described as a thing, it can also, we believe, describe a sensibility: a way of thinking and acting in the world capable of moving between the separate registers of technical and social action. From this point of view, the world is largely (though not infinitely) substitutable. Technology can, under the right conditions, stand in for what might otherwise be accomplished through human work. Conversely, human norms and interactions can substitute for technical fixes, sometimes with extraordinary efficiency. (S. J. Jackson et al., 2007, para. 25)

The next section examines how art educators in this study act on this sensibility by functioning *as* infrastructure.

6.1.2 The art teacher as infrastructure

The task given to the participants during the final fantasy phase of each workshop was to make a representation of their desired future art classroom. The participants were explicitly asked to focus on the material set up of the classroom, such as architecture, communication technologies and tools. Still, all the maps included a recognition of the teacher within this

—

[179] wsS1

[180] wsE1

space, represented visually on the map (see figs. 11, 19, 21, 22 and 26) or verbally in the discussions. For the workshop participants, the infrastructuring performed by the teacher could not be separated from the other technologies represented in the maps. One participant explains the role of the teacher as someone who "dances around trying to connect all these technologies and ideas", represented on the map through footsteps in between the cut-outs on the surface (see cover, fig. 21 and middle picture, fig. 11).[181] The footsteps, resembling a dance step instruction, indicate a complex practice based on experience, intuition and interplay with the environment. This environment also includes soft infrastructures, such as regulations and guidelines, as noted by two Estonian workshop participants in a conversation about how art teachers make up for the previously discussed incoherence between classroom infrastructure and the new national curriculum for visual arts education, where most art classrooms are designed for theoretical lessons:

> **Participant 1**: Some schools don't have proper art classrooms at all. And in the curriculum, there are a lot of things you need that schools don't have. Like a place to wash your hands, little things.
>
> **Participant 2**: It is not a little thing!
>
> **Participant 1**: No, but basically, if you are a good teacher, you can do everything without it, but it depends on the teacher too. (*Extract from workshop, EE*)[182]

Another educator exemplifies the experience-based knowledge involved in infrastructuring by describing how the process of washing brushes worked differently depending on the size of the group, the number of sinks available and the length of the class. In most cases, the educator washed the brushes himself in order to allow the students more time for working while there was only one sink available. When placed in classrooms with no running water at all, the same educator recalls getting water from a nearby room.[183] By very literally performing "the work of absent tubes and pipes" (Mattern, 2015, p. 106) the teacher was in other words functioning as infrastructure himself.

In addition to sensibility and manual labour, infrastructuring also involves emotional work and social networking. The educator above, who

—

[181] wsS3

[182] wsE1

[183] vwS1

substituted the lack of sinks with manual work, related this to the increased specialization and separation of work. He recalls previously being able to autonomously access useful objects and materials from the school's recycling room but was prevented from doing so when the school changed from a mechanical to a digital locking system, that only allowed janitors access to the recycling room. For the educator, this has amplified the need to keep on good terms with the janitor department, in order for them to "keep their eyes open and tell me when something is going to be thrown away".[184]

The importance of informal networks is also visible in the images below (fig. 12), that shows how objects found in other parts of a school or university are repurposed in art classroom infrastructuring, for purposes such as storage, sorting and material maintenance. The plastic containers and boxes in the first image were given to the art teacher by the kitchen staff and are used for everything from organizing small items to mixing glue or washing pencils.[185] The drawing cabinet in the second image is used to store student work and to keep different kinds of paper sorted and was found in the biology department where it was previously used to store maps.[186]

Figure 12. Findings from the kitchen and the biology department. Stills from video walks.

These examples show how things are used to substitute the manual and logistical work otherwise performed by teachers, such as how the cabinet in the image above substitutes the work of teachers moving student work from the storage room to the classroom. In another category of recycling, discarded material and objects are used in artistic work, such as still life drawings, installations or the media archaeological approaches described in the previous chapter. Common to both these categories of recycling is the notion of *repair*, defined by Gerasimova and Chuikina as

—

[184] vwS1
[185] vwS3
[186] vwS1

> a set of techniques that prolong the life of objects by restoring to them their pragmatic or symbolic function. Broadly speaking, this can include fixing the item, adapting it to a secondary use, using it as material from which to make something else, redefining its symbolic status, changing the context in which it is utilized, and the like. (Gerasimova & Chuikina, 2009, p. 61)

In this case, repair is used to make up for logistical problems in a certain space (the classroom and storage facilities) or to change the symbolic meaning of an object in artistic work. Reusing objects is, in other words, more than just an affordable way to access material and equip the art classroom. For the participants, the ability to rethink the purpose, context or meaning of an object is also connected to creativity and something that should be promoted in preference to always using new material, bought especially for art making purposes, "the right way of thinking of art as *remida*, or recycling" as one of them puts it.[187] Others stress the environmental concerns involved in recycling, and the advantages of using older cultural techniques instead of digital components that reinforce environmental effects and global inequalities. One of the workshop participants explains:

> Many craft teachers are critical [to digitalization] from an ecological perspective. Should we purchase little batteries and LED and things made in China that are sold here for nothing, harming the environment? There is lot of that kind of criticism… is it worth it? (*Extract from workshop, SE*)[188]

While mending or repurposing items for different needs fits well with the contemporary emphasis on sustainability, it is of course not a new praxis, but was also key to premodern society, where material resources were scarce and most products were made locally, by hand (Kannengießer, 2020; Stöger, 2016). The lack of material assets also applies to the Soviet era, that according to Gerasimova and Chuikina (2009), can be characterized as a *repair society*. Malfunctioning objects were not thrown away but kept and modified to meet the needs of their owner, who at the same time adapted to the characteristics of the object in a "mutual habituation between objects and people" (p. 67). As Lapinskė (2020) points out, this "Soviet schooling in creativity" is not only about practical needs and coping with poverty, but also about making life more meaningful and vital. Neither is it something

—

[187] vwS1

[188] wsS3

that belongs to the past, but rather an ongoing way of living which in turn can be understood as a way to process and care for the past because it makes visible "the relationship between 'temporary' and 'permanent' structures, showing care, mindfulness and cultural appreciation of what is inherited" as put by Martínez (2018, p. 60) in his book about the Soviet legacy in Estonia.

The characteristics of a "repair society" in many respects also apply to the culture of visual arts education. Not only do art educators perceive a lack of adequate infrastructures and equipment to perform their work, they also adapt their own practices in relation to things, use old objects and technologies as a way to maintain the past and separate "the symbolic from the material aspect of things" (Gerasimova & Chuikina, 2009, p. 61) through the creative appropriation of objects in artistic work. The processing of distinctions between finished and unfinished work, clean and dirty areas, trash and useful material also points back to the civilizing qualities of visual arts education discussed in chapter five. Cultural techniques in this broader sense are at the heart of art and art education, not least given the frequent use of recycled material and objects. In order to decide whether a broken vase is a still life object or trash, whether a stone belongs to the material cabinet or in the school yard, or if a paper with paint marks on is a work in progress or something that can be used to cover a table during work, distinctions have to be made.

The *processing of distinctions* (Siegert, 2015, pp. 14–15) is also related to the sensibility to maintenance and logistics discussed in the previous section. Common to all eight workshops was the desire to be able to work with many different techniques in the classroom. At the same time, digital technologies were often separated from older cultural techniques in the maps produced during the workshops. When asked why, many participants gave very practical explanations such as to "avoid getting clay on the computer tablets".[189] The separation between dirty and clean technologies had, for them, less to do with the different traditions of art teaching than the practical issues related to working with sensitive digital devices, solved here by organizing the classroom into different areas, where in one space clay is a material to work with and in another it is dirt that needs to be removed. The teacher is part of this infrastructure by directing the students to the right area but also as someone who adjusts the teaching activities to fit the objects involved, in this case the incompatibility of digital devices and water.

—

[189] wsS3; wsE4

Figure 13. Processing distinctions between inside/outside, clean/dirty. Map from workshop.

An example of how the art classroom as such manages distinctions can be found in the image above (fig. 13), showing the final map from one of the workshops performed in Sweden.[190] The map is separated into five parts. In the centre of the image, there is the main area with a big table and chairs in the middle for discussion and work. Around that space, analogue and digital resources are placed; magazines and books below the table and applications, platforms and online media archives above the table. Beside the digital resources we also find digital tools such as a camera, a laptop and a smartphone. Below these tools is a separated area for obsolete media technologies, such as analogue cameras and cassette players, a mini "technical museum" for students "to be inspired by and to explore" as one of the participants put it. Below that, in the lower left corner, is a small room for groups and project work. The right part of the map is designated for messy techniques involving water, such as clay work and painting (the text on the white area reads "tiled" in Swedish). It also contains an outside space, separated from the classroom by a curved line with small, crossing lines, indicating windows. This outside space contains three brown elements, representing sticks and stones. The participants in this workshop empha-

—

[190] wsS2

sized the use of material from nature in visual arts education, and the window wall between the classroom and the outside here represents the mediating third between a stick in the woods and an artistic material. In this map, the art classroom is represented as a combination between architecture, technologies and practices that processes the distinctions between nature and culture, dirt/trash and art thus constituting a basic cultural technique.

The cases of infrastructuring discussed above makes visible how infrastructures are always negotiated between different groups and their interests. Managing an art classroom demands an infrastructural sensibility and imagination that those without experience of teaching or making art might lack, and that enters the discussion with other interests (not least financial) and preconceptions. Sometimes these negotiations result in the emergence of new infrastructures, or in the repurposing of established ones. The following section will discuss the relations taking place in and around this *shadow development* (Mattern, 2015, p. 106, 2016, p. 5) and how local configurations of infrastructure might migrate into national systems for visual arts education.

6.1.3 Shadow development

When pointing out deficiencies in their working environment, many of the participants perceived a lack of support from the management, understood as a sign of the low status of visual arts education in relation to other subjects or with the notion that the management have an outdated idea about what art is about and the processes behind creative work.[191] One such preconception is that "art is only paintings", as one participant puts it while showing me the art facilities for teacher training.[192] In accordance with this idea of artistic practice, the space assigned for student exhibitions was not suited for showing work that demands darkness or a limited space, such as video art or installations, although these contemporary approaches are now part of the curriculum that the prospective teachers are going to teach in the future. The participant recalls that when the management did not recognize the request for such a space, the educators involved in making student exhibitions appropriated an old box-room to make a provisional exhibition space, which later became permanent. In this case, the negotiation between management and educators resulted in a *shadow development* of the built

—

[191] iS8; iS9; vwS1; vwS2; vwE1; vwE2

[192] vwE2

infrastructure that aligned with established work practices as well as with written standards within the subject.

Similar to how many art classrooms are not equipped in line with what is demanded in the curriculum or accommodated to receive three hundred pupils a week, standardized learning management systems are not designed for teachers having several parallel classes. One participant explains giving up trying to use these platforms when realizing she had to create separate virtual classrooms in order to post the same information to all classes:

> I have realized that the new system is not working for us art teachers either… I would have to work overtime at home. It is different practical things that do not work if you have many students. If I want to give the same information to sixteen classes, the new system says, "you can only make one communication space for one class", and then… no! I refuse to upload the same information sixteen times… and it has been like this for fifteen years! (*Teacher participant, SE*)[193]

Instead of trying to fit it into the school's official digital system, the educator decided to gather all her teaching material on a private website. This decision was also informed by other precarious conditions related to visual arts education, such as the lack of working opportunities that meant that the teacher had to switch between different short-term positions, and consequently between different kinds of systems and platforms. Although initially meant as a resource for her students, the educator recalls how other art teachers soon found the site and started reading and engaging with the material. This developed into a network of like-minded art teachers and came to function as a supplement to local and municipal networks where the teacher felt that her ideas on art education did not resonate. In this case, the shadow development performed to substitute deficient infrastructures had the positive side effect of gathering together teachers interested in a certain aspect of the subject.

However, not all teachers have an interest in creating their own websites to compensate for flaws in existing systems. As one participant put it, recognizing the work involved in such infrastructuring: "We can't make our own little platforms, just to fight the system. It doesn't feel like good use of time".[194] Instead most teachers repurpose existing infrastructures in line with their interests, such as how Facebook and other established social

—

[193] iS8

[194] wsS3

media platforms are used for everything from exchanging assignments and ideas to discussing wages, group sizes and budgets and even arranging off-line community meetings. The latter shadow networks function much like the blog described above, as a meeting point for like-minded teachers and a supplement to the municipal art teacher networks. One group of art teachers in Sweden, with members located within travelling distance from each other but not within the same municipal school district, have arranged to meet on a monthly basis in each other's art classrooms to discuss different topics, share ideas and compare their working conditions. During a visit to one of the meetings, one of the participants explained how important it was to meet colleagues who thought about visual arts education in a similar way, as "being about becoming critical and aware, and giving the children confidence to make images themselves" and not only in terms of production or "make, make, make" that she otherwise perceived as the most common approach among art educators.[195]

This criticism of visual arts education as being too focused on production is very common among the participants in this study. Many complain that teachers turn to social media sites for inspiration due to lack of proper training. Compared to a textbook, which is edited and written in correlation with the national curriculum, self-produced online material and teaching resources demand that the teachers make informed and critical choices when browsing the web for information. One of the workshop participants reflects on how digital tools have increased the complexity of teaching by comparing it to older school media:

> In one way, I think it was easier being a teacher before, because then at least you had these finished posters you could roll down and say "this is Småland" and "this is a crow". It was so canonized. The technologies we use now also demand that we are critical. (*Extract from workshop, SE*)[196]

For some participants this expansion of the subjects is not only something that makes teaching harder but also a possibility to include new perspectives, not least on subjects like art history.[197] However, most participants also seem to agree that many art teachers are not well trained or prepared enough to make such informed choices, and therefore tend to go for what

—

[195] From fieldwork notes.

[196] wsS1

[197] iE12; iE14; iS2; iS6

the participants call "cookie cutter art"[198] or "recipe book art",[199] that is using templates that all pupils should copy with regards to material, technique and motif (c.f. Vahter, 2016, p. 52). Many recalled having walked into classrooms, finding a wall of twenty-five identical birches, apples, snowflakes or whatever the teacher in question had found on Pinterest.[200] One educator describes the characteristics of online lesson sharing like this:

> Some teachers have groups on Facebook or Pinterest where they share their so-called ideas, but I'm not so impressed. /…/ What they tend to do is, like, they take, I don't know… for example, a yoghurt cup and glue some plastic eyes onto it and then they are so happy for having created such a lovely thing. Like… production, production, production, but again… why? (*Teacher participant, EE*)[201]

Some participants explain the phenomena of "online cookie-cutter art" with reference to a perceived de-professionalization of art teachers that is taking place when recreation instructors (in Sweden) or class teachers (in Estonia) get qualified to teach art up to a certain age[202] or when schools hire untrained teachers.[203] In Estonia, it is also considered a partly geographical problem, located to the rural and Russian speaking parts of Estonia, and made some participants argue the need for textbooks and teacher manuals in visual arts education.[204] As one of them puts it:

> They really want to have more books, and I feel like it is ok if you have so little preparation, then it would be really good to use some books and use some prepared lessons. It is better than Pinterest! (*Teacher participant, EE*)[205]

"They" in this case refers to art teachers with no professional training working in rural areas, or those in eastern Estonia understood as being limited by their educational background and by outdated Russian language teaching material. Although the whole country shares the same curriculum, there is the notion that the Russian speaking schools still use old templates

—

[198] iS8
[199] iS2
[200] iE11; iE13; iE15; iS2; iS8
[201] iE11
[202] Grade six in Sweden and grade nine in Estonia.
[203] iE13; iE16; iS4; iS5
[204] iE1; iE3; iE12; iE14; iE15
[205] iE15

and method books based on teacher-instructed drawing instead of interpreting the current curriculum or designing their own assignments.[206] The educators believed that this made it more likely for some to resort to substandard online material, and that a book in that case would provide a better alternative. The idea that books can "raise the lowest level of teaching"[207] is also put forth by some of the Swedish participants, who relate the slow progress of the subject to the lack of (good) books on art teaching, and the persisting idea that art teachers always have to create their own material.[208] Participants in both countries believed that books would provide more coherent, contemporary and well-founded approaches to teaching art than the online resources that were considered messy and full of outdated ideas.[209]

The idea that a book can do something that a blog or online forum cannot is not only a matter of comparing different content, but also shows a sensibility to the medium itself. Two important qualities of the book are that it is edited and indexed. A printed book is also durable and can be picked up after several years, compared and used in tandem with other books in order to keep open the possibilities for negotiations around the subject. For one of the Swedish participants, this also disqualifies the digital textbooks many schools are subscribing to because they tend to make schools "throw out all old books and again end up with only one source of information".[210] Another quality ascribed to printed books is mobility, not least for the Estonian participants where the textbooks and manuals were thought of as a way to bring together the rural and urban parts of the country and overcome differences in educational cultures between the Russian and Estonian speaking areas. In Innis's (1951) terms, the space-biased medium of the book can make up for the lack of time-biased media such as the museum (providing experiences of contemporary or international art) or the university (providing education for teachers).

—

[206] The approach to online material in this academic tradition is complex, however. At the same time as it relies on the same idea as much of the material found online, where the pupils copy a drawing or painting, there seems to be a resistance against using social media in teaching, and one Russian speaking participant (wsE2), working at a Russian speaking art school describes how she was forbidden by the head of school to use YouTube videos about perspective drawing in her teaching. Instead, she was expected to use the method books provided or to make templates herself (to show that she was competent enough).

[207] iS1

[208] iS2

[209] iE1; iS2

[210] iS1

But the shadow development of educational media, networks, classrooms and online spaces described above does not only supplement existing infrastructures, it also reshapes them, in line with the notion that infrastructures emerge through organic processes in relation to established systems through overlapping, substituting and opposing these (Edwards, 2003, p. 222; Mattern, 2015; Star, 1991). One of the Estonian educators involved in developing a new curriculum for visual arts education explained that this process was partly driven by the introduction of new textbooks, and conversely, that these changes increased the demand for more books.[211] Teachers who are active in online discussions are occasionally invited as speakers at conferences, to take part in educational media productions and as professional bloggers. One teacher in Sweden was even invited (and accepted) to write a teaching manual on visual arts education after having debated the lack of such resources in social media, and a group of Estonian art educators decided to write and publish a textbook on contemporary art themselves to overcome what they perceived as a gap between the curricula and what was going on in art classrooms around the country.[212]

This subchapter has described some of the workarounds and configurations performed by art educators to compensate for the shortcoming of digital systems, soft infrastructures or classroom design. It has also discussed how educators recognize and critique the embedded biases of, for example, social media platforms, and how some of their work has resulted in the emergence of new, or repurposed, infrastructures in a *movement from insufficient infrastructures via shadow development to institutions*. This work mainly takes place outside formal structures for decision-making, where the participants in this study felt that they did not get any support or recognition for their ideas. Instead, they stated that they rely on informal, local or social networks in order to develop functioning modes of working. This means that much of the infrastructuring performed by art teachers remains hidden, resulting in a struggle among many art educators to make their work, and what they perceive as subject specific knowledge, visible. The next subchapter discusses how these visualization practices play into control systems of contemporary education, at the same time as they might contribute to gaining legitimacy for visual arts education as a school subject.

—

[211] iE1

[212] iE3; iS1; iS8; iS9

6.2 Between invisibility and visualization

When I first started exploring the relation between visual arts education and media technologies, I was convinced that art teachers perceived their subject as any other school subject, with a fairly limited scope and clear criteria for assessing knowledge. This idea came from one of the first pilot studies performed in the project where I mapped the discussion in different social media groups for art educators. The topics discussed there typically included grading practices, how to design assignments to correspond to certain learning outcomes in the curricula and how to motivate the importance of the subject to students, parents and colleagues. Later in the process, when I started to talk to art educators about their work, and discovered alternative discussion networks, a very different image emerged of a school subject building on a holistic understanding of knowledge and on open-ended learning processes. In other words: depending on the context, the way art educators perceived the aim of their subject came across very differently. But how is that?

One way of understanding the difference is by looking at the online discussion as a kind of *articulation work* (Star & Strauss, 1999, p. 10) aiming to fit the skills and knowledge developed in visual arts education into the apparatus of the contemporary school system. This mundane and many times "invisible juggling work" (Bowker & Star, 1999, p. 310) includes organizing, monitoring, adjusting and coordinating activities to make them fit into standardized systems and infrastructures, and conversely – configuring these systems to fit local practices (Fujimura, 1987, p. 258; Suchman, 2002). As Star and Strauss (1999) have shown, articulation work also "manages the consequences of the distributed nature of work" by making up for a lack of understanding between different specialized professions (p. 10). In this case, articulation work seems to be a way of also managing the consequences of a *distributed nature of knowledge* in contemporary school systems, visible through curriculum fragmentation and goal orientation. Digital media plays into this process in two ways, by offering a space for articulation and by pushing the need for articulation work in the first place by reinforcing work specialization and standardization.

The gap between how art educators see their subject and the educational imaginaries put forth in the national curriculum in Sweden and Estonia, which focus on cognitive and measurable skills, creates a tension where art teachers on the one hand try to make visible what they recognize as most important in their subject, and on the other hand try to fit these practices

into educational standards and systems. In this case, the difference between the visualization of subject specific knowledge and *articulation work* as defined by Star and Strauss (1999) is not fixed but in constant negotiation. The relation to media technologies, materials and environments in visual arts education, as well as the marginal position of the subject in a goal-oriented and instrumental school system is discussed below as a dynamic between invisibility and visualization, including 1) the articulation work performed by teachers to make their work fit with established standard and discourses, as well as to gain recognition for their work, followed by 2), how the infrastructural imagination of art teachers is played out in relation to soft infrastructures for monitoring and control.

6.2.1 Making work visible

A common theme among both the participants in the study and in the online discussion is the notion that parents, management, other teachers – and even the pupils – question what visual arts education is good for. In Facebook discussions it is referred to as an "eternal question" and the starting point of many discussions on how to best present the subject and its importance in a parents meeting or during the first lesson of the semester. On a similar note, one of the participating educators recalls how a group of parents at a former workplace questioned what their children really learned in art education, on the basis of them seeming to "enjoy the lessons too much":

> In this school, there was a kind of parents that we were not used to… who said, "what do they learn really, they have so much fun?" for example. And well, how should I explain that? I think I felt that I lacked a professional language. (*Teacher participant, SE*)[213]

For the participant, now a teacher educator, this experience showed the importance of knowing how to verbally articulate subject specific knowledge. The low status of the subject made it highly relevant to make visible what the subject is really about and in what ways it is useful for the students, and to make this fit into the language of learning outcomes and useful competences. The idea that educational outcomes can and should be measured (at the expense of more overarching discussions about what we want education to *do*) applies to all school subjects, but perhaps Gert Biesta's (2010) question "whether we are indeed measuring what we value,

—

[213] iS7

or whether we are just measuring what we can easily measure and thus end up valuing what we (can) measure" (p. 13) is more acute for a subject like visual arts education because of its association to subject formation, emotional and democratic abilities. Visual arts education also relies to a large extent on non-cognitive or verbal knowledge that is hard to translate into written text. Indeed, many art educators in the study worry that the increased focus on assessment in the school debate might count against what the educators themselves regards as important, and instead reward the same abilities as in other school subjects, such as the ability to describe and reflect over processes and results in written text.[214]

At the same time, the articulation work performed in order to make visual arts education fit into the text-based world of curricula, grading and goals also makes the subject visible to other professional groups. In this context, the term articulation can also represent acts of making hidden work and knowledge visible. By making work visible, teachers hope to gain recognition and legitimacy for their work and for the learning processes taking place in the art classroom, and to make up for the lack of a local professional context (c.f. Eckeskog, 2019). One participant recalls starting a blog about her work because it was not recognized by the management at her school:

> My original idea was to strengthen my position as the sole art teacher at my school. I felt very vulnerable in relation to the management and got a lot of criticism, and in that situation, it meant reaching out a hand and establishing contacts and collaborations… to test yourself outside your own contexts. How am I as a teacher? Am I doing a good job? What kind of response do I get? (*Teacher participant, SE*)[215]

The teacher continues by explaining how writing about the work she did with the pupils in the classroom, knowing that others would read it, strengthened her ability to reflect around her own practice and made her more secure in her professional role. The process of making work visible was initially more important to the teacher than the actual representation of it, and recognition from the professional community meant more than whether it reached management or not.

Others push the importance of making art education visible in the public school debate. One participant criticized closed discussion groups in social

—

[214] iE2; iE8; iE11; iE13; iE15; iS3; iS4; iS7

[215] iS9

media for the reason that "we cannot complain within closed fora, we need to get out there and make ourselves visible. In other Facebook groups, in magazines… just to make it visible that there is a discussion, and to spark some interest [for visual arts education]".[216] In the Swedish context, there are several examples of educators who have been trying do precisely this. There is an abundance of Facebook groups, teacher blogs, webpages and even a social media driven event that go under the name "visual arts education day", aiming to make visible the importance of visual arts education and put it on the public agenda. One of the initiators describes the idea on her blog:

> Imagine a day on facebook, instagram, snapchat, linkedin, twitter, youtube… where you are simply bombarded with events, making and thinking from art classrooms all around Sweden. Take the chance to photograph, film, have hangout discussions, put it on youtube, get accounts – give others the chance to show their artwork. (*Art teacher, SE*)[217]

As illustrated in this quote, teachers representing visual arts education in different media channels are striving to make visible not only the knowledge forms associated with art education, but also the complex work behind the development of such knowledge. Paradoxically, the work put down in making work visible is seldom recognized as such (Suchman, 1995). Many participants state that all the online work-related discussions, networking and sharing of experiences and ideas have to take part during their free time, because they are not taken seriously by the management.[218] One participant explains that her boss would consider it cheating if she were to leave work early to participate in online discussions about the subject despite not having any other art teachers at her school to discuss with. At the same time, she reports feeling "run down" from "constantly working" and consider spending less time on-line because of this lack of formal recognition.[219]

Other participants in this study, who have been very active in online discussions reason in a similar way, recognizing that the free labour put into online discussions is not recognized or valued.[220] The collaborative effort of

—

[216] iS12

[217] My translation. The names of platform and social media providers are written in lowercase in the original post and reproduced here accordingly.

[218] iE1; iE3; iE13; iS8; iS9

[219] iS9

[220] iS1; iS8

educators not only provides global companies with free content but also makes possible a continuation of precarious working conditions where teachers make up for the lack of planning time by sharing finished materials and ideas with each other (c.f. Rensfeldt et al., 2018), and one participant asked rhetorically: "Is it our job to do things on the internet? Is it important?"[221] In Estonia, most art teachers seem to share this hesitance and one participant who runs a long-standing blog with art teaching material reports receiving criticism from colleagues for sharing material for free, event to the point of being called a "prostitute".[222] Instead, the online resources in Estonia are to a larger extent already institutionalized through, for example, state-run websites and portals, where the contributors receive a modest reimbursement for their work.[223]

In an inversed process of how articulation work can render art education visible to a larger community, attempts to make art education visible on its own terms can also play into systems of control and standardization. As both Star and Strauss (1999) and Suchman (2002) have shown, regardless of motive, all representations of work risk leading to a reduction in complexity. In the case of visual arts education, this applies both to the messy processes of work and to the perceived aim of the subject as Bildung, both hard to pin down and articulate as knowledge outcomes. From this perspective, the striving for recognition of the subject might come at the cost of losing some of its specificity. Put differently, making work visible is a double edged sword, creating opportunities not only for recognition but also for surveillance.

Indeed, much work remains invisible for good reason, including the work of nurses and teachers who "may quietly carry out work reflecting a holistic view of the student or patient, carefully kept out of the range of a more bureaucratic, reductionist set of values" (Star & Strauss, 1999, p. 23). The messy processes of creative work, including such elements as play, chaos, failure and confusion, is perhaps best kept at distance from management and parents. By not trying to fit certain knowledge forms into the system of contemporary goal-oriented schools (or by keeping such articulations to a necessary minimum) art teachers can focus on helping the children develop as humans and citizens instead of doing paperwork. One

—

[221] iS1

[222] iE13

[223] The extensive investments in e-learning materials and digital textbooks from the Estonian state could also be understood as an attempt to maintain the country's reputation as "e-Estonia".

workshop participant summarizes the advantages of invisibility in the following way:

> There are so many demands and visual arts education is always considered as some kind of underdog, and "we are marginalized and blah blah blah", but you can also turn that around and say "well, then you can do whatever you want!". (*Extract from workshop, SE*)[224]

The need to make visible the work being performed in the classroom and the knowledge produced is of course not only driven by individual art teachers but is an effect of the growing measurement culture in education (Biesta, 2010). This culture is, in turn, reinforced by processes of digitalization and platformization, making possible new forms of surveillance, control and evaluation (Selwyn, 2014a). As discussed above, this applies to all school subjects, but digitalization also boosts articulation work in visual arts education by constituting a background for legitimizing the subject. Measurable objectives, as well as more holistic aims of the subject, are often motivated from within the art teacher community by changes in culture and communication associated with digitalization, such as the ability to work, participate and orient in a highly visual and "deeply mediatized" (Couldry & Hepp, 2017) society.

One initiative aiming to make visible the importance of visual knowledge in a mediatized society is a podcast on the topic of visual culture and media literacy, written and produced by three trained art teachers who are now working with further training of teachers in all subjects around media literacy and digitalization. In their work, they noticed a lack of understanding of what images do and how they can be used in education, both among practicing teachers and also within the media literacy field as such, which they experienced as preoccupied with source criticism and fake news. According to one of these educators, images in this tradition are also understood and approached from a true/false perspective, focusing on such aspects as metadata and photo manipulation while perspectives and concepts associated with the communicative tradition in visual arts education, such as semiotics and genre knowledge, tend to be left out.[225] In order to promote the importance of such perspectives, they turn to a broader audience, motivated by another person in the group:

—

[224] wsS1

[225] iS10

> My parole has always been that images and visual communication is a matter for people outside the realm of art. Visual arts education in schools is often a very isolated subject, but images are a matter for social sciences, history… I mean, we communicate visually in most subjects, and there is a dangerous lack of knowledge here. (*Teacher participant, SE*)[226]

The dynamics between digital media as at once accentuating the need for visual knowledge and pushing processes of standardization is summed up by another participant saying that "the digital brings the importance of new forms of knowledge to the fore, at the same time as it enables mechanisms of control".[227] To this can be added the possibilities of collaboration between teachers made possible by informal, digital platforms for communication as well as the practical work involved in making technology work in everyday teaching.

In this section, I have described how the work of making knowledge visible is related to control systems of contemporary education, at the same time as it might gain legitimacy to the subject. Articulation work, otherwise described as invisible work, in this case also contains another element of articulation in the sense of an utterance or a representation. The next section discusses how such representations can function as strategies of invisibility and how the infrastructural imagination of art educators is played out in relation to soft infrastructures.

6.2.2 The poetics of fabrication

In the above discussion, the development of a professional language is put forth as an important aspect of making visible to parents and others what students learn in visual arts education. Using a professional language is also related to a *specific kind* of articulation work, namely the ability to underpin and motivate educational designs and professional judgments using the curricula, and to document and present work processes in accordance with expected outcomes. One participant, a former teacher educator, states that during their teacher training "it is important to show the students how they can use the curriculum to explain to the parents or the headmaster why they do certain things" in order for the student to manage inspections and potential criticism from management and others in the future.[228] Another participant talks about photographic documentation as something per-

—

[226] iS11
[227] iS7
[228] iS6

formed mostly "to show that you really do something in class", and not as a pedagogical tool.[229]

These approaches to pedagogical planning and documentation can be defined as what educational sociologist Stephen Ball (2006) calls *fabrications*, the conscious performance of pedagogical practice in accordance with the perceived demands from an increasingly neoliberal school system, related to the "contract thinking" discussed by Lundahl (2005) where individual teachers are held accountable for meeting educational goals. Fabrications differ from the pursuit of making work visible in that they are not aiming at giving a true image of what is going on in the classroom or making visible hidden forms of knowledge, but rather at meeting the constraints of contemporary education. "Truthfulness is not the point – the point is their effectiveness" as Ball (2006, p. 696) puts it. For Ball, the process by which "[w]e articulate ourselves within the representational games of competition, intensification and quality" points to a "struggle over visibility" (p. 693) where teachers on the one hand submit to instrumental models of structuring and monitoring teaching and learning processes, and on the other hand produce convincing representations of these models as a strategy of invisibility:

> However, the work of fabrication points to a second paradox. Technologies and calculation which appear to make the public sector organizations more transparent may actually result in making them more opaque, as representtational artefacts are increasingly constructed with great deliberation and sophistication. (Ball, 2006, p. 698)

The creative and strategic work behind producing such artefacts is referred to by Ball as a *poetics of fabrication* (p. 697).[230] This process demands an understanding of policy, curricula, assessment and grading criteria, national standards and documentation procedures as infrastructures that can be opposed, supplemented or bypassed by means of convincing manual paperwork. By presenting one thing and doing another, teachers can maintain established work practices and act in accordance with their professional beliefs despite changes in the educational policy landscape. In other words, a poetics of fabrication in contemporary education calls for an infrastruc-

—

[229] wsS4

[230] Used here because the term "poetics" indicate a focus on the techniques involved in fabrication, rather than on the *meaning* of such constructs (Calinescu, 1979).

tural imagination in institutions as well as among individual teachers (and students).

For the Estonian educators, this is an established way of relating to technologies of control. As discussed in chapter four, educators in Soviet Estonia often developed a double system of, on the one hand, official accounts of their teaching in line with prescribed guidelines, an on the other hand the implementation of a shadow curriculum in line with their own pedagogical beliefs (Krull & Trasberg, 2006; Pilve, 2014; Tuul et al., 2011; Varik, 2013). As explained by the Estonian cultural theorist Epp Annus (2016, p. 3), people learned "to speak the right way" at the same time as they, at least in certain fields, established a certain distance from the official Soviet discourse. This distance should not be understood simply as an act of resistance or as a hidden practice, but as a "semi-institutionalized, semi-implicit" model of *double standards* where "both the dominant and the dominated are well aware of each other's hidden transcripts" (Baločkaitė, 2011, p. 416). In other words, following the argument of Russian born anthropologist Alexei Yurchak (2003), the difference between the fabrications produced by Estonian educators during the Soviet era and what was going on in their classrooms should not be seen as a strict dichotomy between state and people, public and private or false and true but as a routine reproduction of ideological *forms* that may, or may not, align with personal beliefs.

This image is confirmed by several participants in this study, who explained that many art teachers in the Soviet era developed a semi-implicit "double entry system" where they reported on their teaching in accordance with the prescribed curricular package, whereas their classroom activities were adjusted to fit the needs of the local circumstances or were simply messier.[231] One participant described this system as a consequence of a state-governed contract thinking, stating that "in Soviet times, teachers were afraid to be judged on students' work".[232] Another one recalls having to visit the Ministry of Education in Moscow to defend the use of non-prescribed teaching methods.[233] At the same time there seemed to be a mutual awareness between teachers, students and inspectors that the teaching diary was not a representation of what was actually going on in the classroom, described by Yurchak (2003) as a pragmatic stance where "the acts of copying

—

[231] iE1; iE2; iE10; iE11; iE13; iE14

[232] iE10

[233] iE14

the precise *forms* of ideological representations became more meaningfully constitutive of everyday life than the adherence to the literal ('semantic') meanings inscribed in those representations" (p. 481). Or as described by one of the participants on the topic of teaching versus representations of teaching: "There is real life, and there is perfect life".[234]

In contrast to the Swedish educators, who tend to talk to a greater extent about curricula and guidelines as something that must be followed, the Estonian educators seem to have kept this pragmatic view on curricula as a more or less arbitrary sign, post-independence too. Despite the shift to a more general framework with increased teacher autonomy, pedagogical planning and documentation is still mainly considered as paper-work with no given connection to what is going on in the classroom. When asked what happens if teachers do not follow the national curriculum, one participant answers:

> Nothing. They might have some controls, but they [the teachers] just fill in the documentation quickly then. /…/ What I've also noticed is that friends share finished documentation with each other. They just copy-paste and provide the documents but this is not actually what they do in the classroom. (*Teacher participant, EE*)[235]

This image is confirmed by another participant who was almost annoyed by my questions about the difference between the old and new national curriculum in visual arts. In her view, the changes were not that important since they were only on paper and did not reflect the practices going on in schools around the country:

> But still, it is only what is written in the curriculum! If you go to some ordinary school in Estonia you can see that teachers still continue to teach the old curriculum, because they don't believe in this new one and maybe they lack the preparation for it. (*Teacher participant, EE*)[236]

As previously discussed, many Estonian participants located the disregard for new national guidelines to the Russian speaking areas in the country. Some also claimed that the Soviet model of top-down inspection and teacher diaries still applied there. "In Narva, there are still headmasters who dictate exactly what the teachers should do in their class" explains one

—

[234] iE10
[235] iE11
[236] iE16

participant.[237] Another reports about being in charge of an in service-training programme in a Russian speaking school area and meeting teachers there who had to show their study plan beforehand to the head of teaching, who went over the plan and "made corrections with a red pen" before the teacher could proceed to the classroom. The same educator explains that it used to be like that in all schools in Estonia but now, the curriculum implementation is more up to the individual teacher:

> Now it is like the national curriculum is only the basis, and every teacher makes his or her own curriculum. It used to be that you wrote down like "this date we do this topic, and this date we do that topic" and then someone from higher up actually checked it with the class diary… but nowadays, nobody checks. (*Teacher participant, EE*) [238]

From these statements, the change from state-governance to self-governance (the notion that "nobody checks" or, at the most "have some controls") and from detailed curricula packages to greater school and teacher autonomy, seems less important for the Estonian teachers who express a persisting distrust in national standards and guidelines. Again, this separation between fabrications and "truth" should not be seen simply as a hidden or nonconformist practice but as something acknowledged and semi-institutionalized. One of the teachers involved in developing the new curriculum, even explains how this process was informed by the hidden curricula of teachers not in favour of contemporary art:

> It [the new curriculum] works best for teachers who want to do very contemporary things, but it also works for teachers who want to work in an old-fashioned way, because it is not written really precisely. We had a situation where we had to give possibilities and support to those teachers who wanted to do things from a contemporary view and who wanted to change, and for those who had previous beliefs in some other direction… well, it's better if they don't hate the programme, because it makes things even worse. (*Teacher participant, EE*)[239]

One attempt to help teachers implement the new curriculum was the textbook on contemporary art, developed by a groups of Estonian art educators and artists, briefly mentioned in the previous subchapter. Similar to the

—

[237] iE10
[238] iE13
[239] iE1

curriculum, this project also offered two kinds of use: either as a resource for teachers already interested in contemporary art, or as something that art teachers who dislike contemporary art but still want to stick to the curriculum in some way can hand out to students for self-study, in order not to have to deal with the subject themselves. According to one of the participants involved in teacher training and the work placement of students, the latter approach was not uncommon.[240]

To sum up, for the Estonian educators in this study an infrastructural imagination was a necessary prerequisite to be able to create meaningful education within the Soviet framework of rigid curricula and inspection. This approach to soft infrastructures and paperwork still applies in Estonia and has resulted in a more distant relationship with the production of fabrications for the sake of monitoring, control and competition than that expressed by the Swedish participants. Perhaps, a "Soviet schooling in creativity" (Lapinskė, 2020) is an advantage when it comes to orienting and negotiating the soft infrastructures of contemporary education?

For one of the educators attending the previously discussed network meeting for art teachers, the tendency among Swedish art educators to adjust to paperwork rather than relying on professional experience and judgement is a sign of "low professional self-esteem" that risks undermining the core values of the subject. For the educator, contemporary assessment and feedback systems are built up around the notion of deficiency and on making up for that deficiency, whereas art education in her opinion should be focused on growth and personal development. To avoid getting caught up in a goal-oriented discourse, the educator refused to use the school platform and instead discussed grading orally with the students, trying to focus on their strengths instead of what they should do to get a certain grade:

> Our task is to make people grow, so when they [the students] ask "what am I lacking, what do I need to improve?" I never fall for that. I turn it around and tell them what they are good at… we should be very careful not to go there! (*Art teacher, SE*)[241]

Presented above are two approaches to fabrication, that in different ways manage the demands of accountability and visible learning of the contemporary school system: The Estonian approach of double entries, where fabrications are kept at bay from everyday pedagogical practice, and the

—

[240] iE3

[241] From fieldwork notes.

overall dismissal of fabrications based on the fear that they will reshape the idea of education into a reductionist and instrumental model as suggested by the Swedish educator in the network meeting. The latter approach builds on some kind of fidelity to policy and guidelines and relies on the invisibility granted by not entering into systems of monitoring and documenttation, whereas the former uses fabrications as a screen behind which other practices can be partly hidden, requiring a distanced and creative view on written rules and standards. The next chapter discusses how these two approaches are played out in the intersection between hard and soft infrastructures, and how art educators can use their infrastructural imagination to envision alternative futures of education.

6.3 Summary

- This chapter discusses the position of visual arts education within the digitalized school in Sweden and Estonia, and how this is manifested through the infrastructuring practices of art educators.
- The educators in this study perceive their subject as having a low status in the compulsory school system and as often not having their needs met in the arrangement of learning spaces or implementation of digital systems. Art educators make up for these inadequate infrastructures by acting as infrastructures themselves, reconfiguring old systems or by developing new ones.
- The low status of visual arts education is also connected to a certain freedom, positioning the subject in the intersection between visibility and invisibility where art teachers on the one hand strive for visibility and on the other hand enjoy the benefits of being invisible. Digitalization plays into this process by offering a space where subject specific knowledge can be made visible but also by pushing processes of standardization and accountability.
- This dynamic expands the meaning of the term *articulation work* to not only refer to the invisible work performed to "get things back on track" but also to include conscious representation of such work.
- A sensibility to infrastructures is part of the art teaching profession, including the ability to recognize, configure and negotiate both

hard (classrooms and logistical media) and soft infrastructures (curricula and professional language).

- In Estonia, this sensibility can be connected to experiences of teaching in the Soviet period when an infrastructural imagination was essential to perform meaningful teaching with a framework of detailed curricula and strict control systems.

CHAPTER 7

Art classroom imaginaries

The previous chapter discussed how art educators use their infrastructural imagination to manage everyday work, and also to create new networks and systems. This chapter discusses how the ability to think with the environment can be facilitated in debates about the role of visual arts education in the schools of tomorrow. Understanding the school environment as a "hidden curriculum" (P. W. Jackson, 1990; Prosser, 2007) or a "third teacher"[242] (Strong-Wilson & Ellis, 2007) are established perspectives in educational research, but rarely emphasize the role of media and communication technologies in this space. To discuss this connection and how it emerges in relation to implicit ideas about education in the future, the chapter draws on the concept *sociotechnical imaginaries* developed by Jasanoff and Kim (2015) to describe how shared visions of the common good underpin technology development and policy in education, and how these visions can be negotiated by the teaching community.

As we have seen, the sociotechnical imaginaries emanating from the edtech industry and policy sector put forth digitalization as something that will fundamentally change teaching and learning for the better and prepare students for a certain future (Forsman, 2019, p. 221; Player-Koro, 2013, p. 27; Selwyn, 2014b; Williamson, 2016, 2017). At the same time, digital technologies are expected to make this future possible by solving all problems of contemporary education as perceived by the dominant political system and "are often used as a proxy signifier for 'the future' and for education's capacity to adapt to and prepare for the future" (Selwyn & Facer, 2013, p. 11). These stories of progress have the possibility to shape the public imagination and become part of a shared understanding of what education is and should do and how digital technologies make this possible.

—

[242] A concept taken from the School of Reggio Emilia that has been very influential not least in early childhood education. The first teacher in this conceptualization is the parent, and the second the school or kindergarten teacher.

However, as Jasanoff (2015b, p. 329) points out, the integration of socio-technical imaginaries into systems of governance and power also opens up for resistance and alternative views on the future. Although not always successful, these counter imaginaries make visible both dominant visions of the future and ways of re-negotiating these visions.

In this chapter, the art classroom is put forth as a space for such negotiations on the role of education and technology in shaping the future. Based on the future workshops and video walks, the first section explores the relation between practice, soft infrastructures and the art classroom, conceptualized by the participants as a "hidden curriculum", while the second explores how the workshop participants imagine their future art classroom in relation to the perceived aim of their subject and ongoing processes of digitalization.

7.1 The art classroom as curriculum

Unlike the official, written curriculum (and often in opposition to it), *a hidden curriculum* is made up by unarticulated and embedded expectations, where the spatial and social configuration of schools carries implicit messages of what should be taught and how (P. W. Jackson, 1990; Prosser, 2007). Whereas the previously described hidden curriculum of Soviet Estonia might be thought of as a strategy of educators to maintain some professional autonomy, the classroom as a hidden curriculum is often discussed in the literature in negative terms, as a repressive space, reproducing inequalities and teacher-centred pedagogy. This is also expressed in one of the workshops, where a participant discusses the relation between media technologies, spatial configuration and educational traditions to argue for the need of educators to break out of the classroom:

> **Participant**: When we talk about technologies for communication in a classroom, like the whiteboard and the projector, they build so much on an old idea of communication, of one-way communication. Like, we should project something here in order for many people to see it and write things here in the front… it is like, a medieval idea of communication. /…/ And then I would like to not be in the classroom at all but in other places, because I think the classroom is such a preservative place, it is in the wall and all this stuff… traditions and constructions of the subject [sweeps all cut-outs to the corner]. I would like to… if I can draw on the board?
>
> **Ingrid**: Of course.

> **Participant**: Then we would go here more often… [draws museum]. I would like to be there, and then maybe in the tv- house… how does that look… [draws] and I would like to have more workshops and guest lecturers, you know, invite things into the classroom… invite and get out. (*Extract from workshop, SE*)[243]

The tangible gesture of sweeping the classroom to the edges of the map shows a great deal of ambivalence towards schools as institutions. Instead, other institutions such as museums, artist studios and media houses are put forward as key educational spaces (see fig. 14 below). It is also important to notice that the art classroom is not swept *out* of the picture, only pushed to the margins where the participants of the workshop explained that it could be used as a resource when necessary, but not as the obvious starting point for artistic education. What the image shows is a dependence on the infrastructures of education, and at the same time an unwillingness to be limited by the hidden curriculum of the classroom.

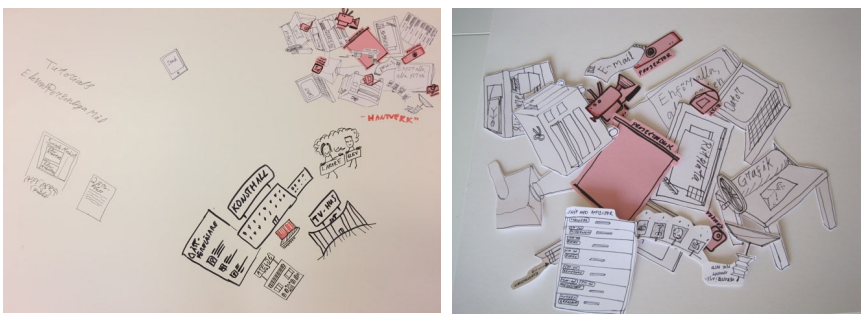


Figure 14. Classroom technologies pushed to the margins. Photographs from workshop.

That participants recognize the classroom as "a preservative place", reproducing certain models of communication is an example of the sensibility to the relation between media, environment and modes of thinking and acting discussed in the previous chapter as infrastructural imagination. At the same time, it shows that the curriculum of the classroom is not particularly hidden, but rather just embedded and implicit, and that part of the teaching profession is to renegotiate the relationship between written and built curricula as well as between official and unofficial curricula.[244] This paradox is also made evident in a case where a group of Estonian teacher

—

[243] wsS1

[244] See also Prossner (2007) and Margolis (2007) for a discussion about the visible aspects of the "hidden curriculum".

educators designed a classroom to meet the demands of the new national curriculum, inverting the idea of the classroom as a hidden (unofficial and implicit) curriculum into the classroom as an incarnation of the (official and articulated) national curriculum.

The decision to design a classroom based on the new curriculum was made in response to the problems discussed earlier on, namely that because visual arts education after ninth grade in Estonia used to be equivalent to art history, many schools were not equipped with proper art classrooms. This makes it very difficult for educators to teach according to the new national curriculum, which includes practical work with both traditional techniques and digital tools as well as giving students possibility to discuss and present their ideas in groups. The situation resembles that of Sweden in 1962 when a range of new techniques were introduced into the curriculum for visual arts education, while most classrooms were designed according to the old subject based on drawing. Similar to how one of the previously quoted Estonian participants compares the relationship between curricula/documentation and reality as that between "perfect life" and "real life" [245], Sten Petterson and Gunnar Åsén describe the gap emerging in Sweden in the 1960s as the difference between an imaginary and an actual world:

> In other words: the partly new art education that emerged demanded a partly new space to be realized. But the question is what happens if the pedagogical space was not renewed "materially"? Is the subject then divided in in an imaginary world built on desires, and an actual world where education is dependent on the frameworks of the school? (Pettersson & Åsén, 1989, p. 103, my translation)

The answer to that question, based on the material from this study on how Estonia educators perceive the recent curricular reforms, would be yes. At the same time, this division is not static but under constant negotiation. Educators are dependent on the frameworks of schools, but also reshape these in line with an "imaginary world built on desires". The newly furnished room, based on the curriculum, thus includes facilities for painting and printmaking such as water and printing presses, as well as a discussion area and a computer park (see fig. 15). "There must be at least one art classroom in Estonia where it is possible to work according to the new curriculum", as one of the educators involved puts it, implying that it is not

—

[245] iE10, quoted in chapter 6.2.2.

possible in most places because of how the classrooms are designed and equipped.[246]

Figure 15. Estonian "curriculum classroom": area for computer work and discussion; wet area; digital printer and printing press. Stills from video walk.

The same educator also explained that it was very difficult to get the management to go along with the idea of a classroom that included both running water and computers, because they were hesitant about having computers in what they perceived as "dirty rooms", and agreed only after the educators introduced a suggestion with different zones; one for traditional printmaking, one for discussion and one for digital work.[247] For

—

[246] iE1

[247] vwE1

the educators involved in planning the classroom, the reaction from the management indicated a lack of understanding of the non-linear creative process where planning, discussion, research and experimentation take place at the same time and in a different order for different students.

Working with zones designated for certain practices but not determining the order or outcome of these practices is, in other words, an attempt to structure and facilitate creative work without predetermining it. Although based on the national curriculum with learning objectives and standards, this approach challenges the prescriptive tendencies of contemporary educational policy. In another workshop, the participants further develop the theme by describing the art classroom as a *structure to utilize the unexpected*. During the fantasy phase of the workshop, the participants decided to push all the classroom technologies, institutions, tools, educational material and online resources to one half of the cardboard, leaving the other half empty. One of the participants made a question mark on a piece of paper and put it on the empty half, while drawing a dashed line across the board (fig. 16). When I ask about this division, the participants explain unanimously:

> **Participant 1**: This [points at the empty space in map] is the space for outcomes. We don't know what is coming out.
>
> **Participant 2**: Yes, we don't know… and the teacher shouldn't decide the outcome, but we can make space for it.
>
> **Ingrid**: What is the relation between these parts then?
>
> **Participant 2:** This [points to parts outside the empty area] is to structure the outcome. (Extract from *workshop, EE*)[248]

—

[248] wsE1

Figure 16. Space for the unexpected. Photograph from workshop.

By "expecting the unexpected" this map represents what educational researchers Teresa Strong-Wilson and Julia Ellis (2007, p. 42) describe as a *negotiated curriculum,* emerging in the relationship between space, intention and practice. In the other workshop described above (where the classroom was pushed to the margins) the participants considered the hidden curriculum of the school building too powerful to overcome or negotiate and advocated a break-out from the classroom. Participants in both workshops, however, together with others, envisioned a dispersed classroom including digital spaces and systems as well as cultural institutions such as museums (see figs. 19, 20, 22, 23, 26). In order to create a good relationship to their students and meaningful teaching in accordance with the national curriculum (that the workshop participants more or less sympathised with), they explained that they needed to exit the school building.

The other case described here, where educators design a learning space based on the official curriculum, is another approach to the same problem, namely how to bypass the expectations embedded in traditional classrooms. The classroom in question was situated in a university institution for teacher training where it was meant to give emerging teachers the experien-

ce of learning in a non-traditional classroom that they could then use in their future profession. Both these approaches reveal a conscious and deep knowledge about the relation between soft and hard curricula which begs the question: from whom is the "hidden curriculum" hidden? The cases also demonstrate the role of communication technologies in maintaining and challenging the hidden curriculum and their embeddedness in both spatial and social configuration. This relationship between technology, architecture, written standards and educational practice, and how it is re-imagined by art educators in line with their vision of the future, is discussed in the following section.

7.2 Imagining the art classroom of tomorrow

This subchapter is mainly based on material from the *fantasy phase* from the workshops where the participants came up with solutions to identified problems together, but also on discussions of future visions of the subject from the expert interviews. In the former case, each session resulted in a map of the participants' desired future art classroom, including online spaces, cultural institutions and outdoor environments that was envisioned by the participants as part of the learning space. The maps and transcripts of participants discussing these are presented and discussed using the analytical concepts from Inge Mette Kirkeby's (2006) dissertation about school architecture, where she introduces five different design principles or ideas about what a classroom or school building can do. This analytic model includes the classroom as a social space; an activity space; a behaviour regulating space; a space as a conveyor of meaning, and a space as a conveyor of atmosphere. These spaces are further discussed here in relation to the conceptualizations of classrooms introduced in *City as classroom* (McLuhan et al., 1977) in terms of mobility, connection and transparency.

From this material, three thematic areas are identified, starting with 1) a discussion on teachers' attempts to break out of the classroom, and with that the traditions, expectations and limitations of traditional visual arts education. This theme partly overlaps with the following section 2) where the participants imagine the classroom as a hub, and visual arts education as a way to re-connect knowledge forms and subjects separated through curriculum fragmentation as well as bridging the gap between school and society/culture. In the last section 3) the participants problematize the openness and transparency associated with digital technologies by putting forth intimacy and seclusion as important in creative work. The chapter also

discusses how educators perceive the introduction of digital technologies as taking time away from working with traditional techniques and materials.

7.2.1 The mobile classroom

Let us return here to the map discussed above, showing the technologies of an art classroom pushed to the edges of the paper, whereas other institutions, such as the museum, the artist studio and the television house, took up most of the space (fig. 14). The participant who initiated this marginalization of classroom technologies explained that she wanted to "evacuate art from the classroom", because she believed that it prioritized teacher-centred teaching and passive learning and made it hard to include the experiences and knowledge of students in the pedagogical design. In other words, the participant perceived the classroom as what Kirkeby calls a *behaviour regulating space,* reinforcing power structures and control, as well as an *activity space* where only a very limited set of practices can take place.

But evacuating art from the classroom does not mean abandoning the classroom. As noted in the previous section, some classroom technologies are still kept within the desired pedagogical space, as a resource to be used if needed. Other technologies, such as the computer tablet (fig. 17, left image, marked with red) are taken out of the classroom to facilitate work in other places. The desire to break out of the traditional classroom, in other words, built on an imaginary of mobility, where digital devices (in this case the tablet), with its possibilities of photographing, editing, drawing and taking notes, make it possible to expand the art classroom outside the school building.

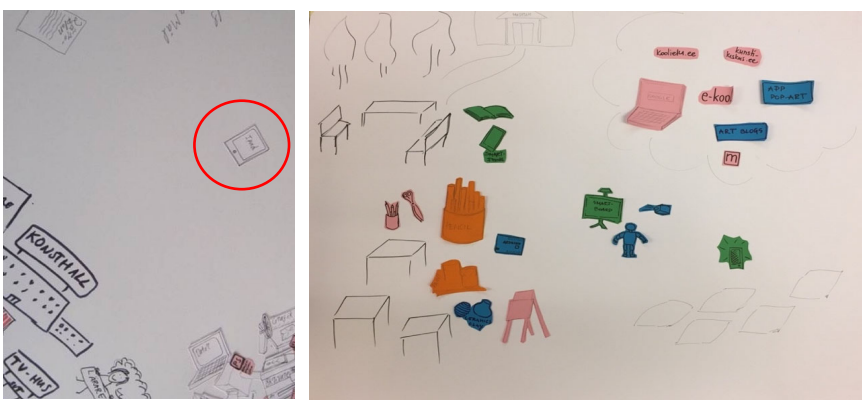


Figure 17. The mobile art classroom. Photographs from workshop maps.

Although not all participants share this antipathy towards classrooms, there seems to be a common ambition to take visual arts education out of the classroom, as well as an unwillingness to restrict or pre-define educational practices. The right image in figure 17 shows the final map from one of the Estonian workshops, where inside (represented through indoors furniture) and outside (represented through trees and outdoor furniture) space are integrated, as well as online space (represented through examples of platforms and digital resources) and offline space (represented through classroom technologies). The furniture is light and movable, such as pillows to sit on (lower right corner) and small tables that can be used one at a time or combined into a bigger table (lower left corner). The participant explains that the map shows different components of visual arts education, represented here by different spaces; one room for the senses, one for information and one for connections to the outside, and that practice is what takes place in-between these spaces.[249] This means that the classroom as such has to be mobile and able to adapt to whatever direction that practice is taking. This recurring idea of mobility is perhaps best summed up by a participant in another session who describes her ideal classroom by saying: "Everything has wheels. Wheels are good!"[250]

Instead of the predefined activities of the traditional classroom, where the teacher talks and the students listen, the participants suggested activity spaces that allowed for what Kirkeby (2006, pp. 99–100) call *differentiation,* that is configurations according to unplanned changes taking place during an ongoing process. In addition, participants emphasized the possibility of exiting these spaces altogether or extending them into the surrounding society and environment. They suggested doing outdoor projects in the schoolyard, visiting museums and media institutions and also bringing in elements from outside into the art classroom, everything from popular visual culture artefacts to natural material. In other words, is not only the art classroom that is mobile in the future vision, but also ideas, materials, and perhaps most important, the teachers and students operating in this context.

The infrastructural imagination at play in this pedagogical approach also includes a sensibility towards environments and logistics, as discussed in the previous chapter. Although encouraged to dream and present utopian visions of the future art classroom, the workshop participants tended to restrict their ideas in line with current limits in terms of groups size,

—

[249] wsE3

[250] wsE4

housing, budget and time allocation. In a discussion about the benefits of older technologies to understand the processes behind image making, the participants immediately bring up the phenomenon discussed in chapter five, on how different areas and equipment in the art classroom tend to be reused for different purposes, due to lack of space:

> **Participant 1**: I want a darkroom!
>
> **Participant 2:** But you don't use that all the time… you should be able to use it to something else too…
>
> **Participant 3:** … and then it will turn into a store-room, eventually. (*Extract from workshop, SE*)[251]

In another workshop, the discussion turns from reasoning about the portable classroom directly to a reflection on acoustics in relation to teaching:

> In the ultimate classroom, for me, everything is portable, and if you want to move everything outside you are able to do that. But at the same time, I think there are organizational issues that prevent that… big groups of children or whatever. To make yourself heard outside, that would be very difficult. (*Extract from workshop, SE*)[252]

In the first example, the fixed organization of having a space reserved for working only with analogue photography is problematized using the imaginary of the mobile classroom where spaces must be optimized to host several different activities. In this sense, the imaginary of the mobile classroom aligns with the sociotechnical imaginary of education as flexible, efficient and useful. However, it also challenges this imaginary, as in the second case, where the desired future classroom as mobile and flexible collides with the participants' experience from teaching, as well as with the increased predefinition of learning activities or "organizational issues". The effort to take art out of the classroom also plays into the school debate on subject fragmentation. The next section discusses how the art classroom is imagined as a way to reconnect not only spaces but also knowledge forms, and how participants perceive the risks involved in interdisciplinary approaches.

—

[251] wsS2

[252] wsS4

7.2.2 The hub

> Actually, it is like this that things are connected… only at school they are separated. (*Extract from workshop, EE*)[253]

The above quote is taken from a discussion about interdisciplinary school projects which took place during one of the workshops, where the participants stated that visual arts offers a possibility to reconnect different topics, subjects and forms of knowledge in an otherwise fragmented school, and also to work as a link between school and society. When asked to expand on the role of the art classroom in these processes, the participants suggested that it can be used "like a community arts centre", functioning as a classroom in the daytime and for other cultural activities in the evenings and weekends. In another workshop, the participants dream of a school where visual arts education is part of all subjects instead of separated into small parts, and where the art classroom, with art teacher included, become a kind of resource centre for all school subjects to use.[254]

If the problem was only a separation between schools and society, or between different school subjects, any classroom could suffice for this resource or but for the participants, art has specific connecting qualities that makes it useful for approaching all kinds of questions and for bringing people and things together.[255] In contrast to this idea of visual arts as some kind of hub, reconnecting what has been separated by specialization, curriculum fragmentation and goal orientation, many participants express a fear of losing the specificity of their subject, or it even disappearing completely if visual arts education becomes too interdisciplinary.[256] "The danger is of art education disappearing because it is supposed to serve all other subjects", says one workshop participant.[257] Expressed here is a tension between showing that visual arts education is important in many areas, and preserving the specificity and autonomy of the subject. This autonomy is also connected to teacher identity, as explained by one of the educators in the study based on her previous experiences of interdisciplinary projects:

—

[253] wsE4

[254] wsS2

[255] iE3; iE8; iS3; iS7; iE8; wsS2; wsE4

[256] iS8; iS10; iS11; wsS4; wsE1

[257] wsS4

> Subject integration is kind of interesting, that can be done in several ways… but it is also a danger, I have seen. We have different specialties and think differently with our different educational backgrounds, so it depends on how you integrate, if you are able to keep this specialist… depth. (*Teacher participant, SE*)[258]

For the participants, this tension was also related to questions about digitalization. On the one hand, digital tools were perceived as opening up for subject integration and making the subject more relevant for groups that have previously not been reached, such as male students.[259] On the other hand, it was seen as a risk when it comes to maintaining subject traditions. One Swedish teacher educator explains that since subject integration prioritizes topics and tools associated with "new media", it might lead to a marginalization of more traditional techniques:

> **Participant:** Of course, it can be dangerous too because… the edges might disappear, and we become too "mainstream" in a way. We have unique ways of going about things and we might have to keep that.
>
> **Ingrid:** Are you thinking of anything specific?
>
> **Participant:** Well, the handicraft part is reduced… if we add digitalization in the way that many have done, the handicraft gets lost because we don't have much time. (*Teacher participant, SE*)[260]

Digital visual communication and culture is here put forth as an argument for the importance of the subject, but it has also added a range of new topics, materials and tools to an already crammed curriculum. This makes some participants question whether it is possible to even discuss visual arts education as one subject anymore, "because it is so incredibly broad that it is bizarre" as one of the educators puts it.[261] Another participant describes visual arts education as "lumping a hundred things together and calling it one thing" and argues for a separation of the subject into one part that deals with traditional techniques and crafts and another that focuses on visual literacy and media communication.[262] This scenario of a future division into two, or even three, separate subjects, is also described by another participant, who thinks it would be an unfortunate development because it

—

[258] iS8
[259] iE11; iE15; iS9
[260] iS12
[261] iS11
[262] iS10

might mean a lost opportunity to raise the status of visual arts education through including digital skills and media literacy:

> There is also a risk involved if the digital disappears totally into another subject… some people will welcome that, but it stresses me out, because I really want visual arts education to gain ground and it does so through including digital skills, because most images today are digital. Hardly anyone is using paint and canvas anymore. (*Teacher participant, SE*)[263]

On the other hand, very few participants seem prepared to sacrifice the paint and canvas and work exclusively with digital media technologies.[264] Although new cultural techniques enter the subject, participants insist that they should "keep everything" when it comes to art supplies and equipment.[265] Older cultural techniques are also related to thinking with the hand, or technē, put forth by the participants as a shared idea of the subject specific qualities and traditions. During one of the workshops, the participants started to discuss the possibility that visual arts education would transform into an all-digital media subject, and whether there were really any valid arguments to be found against this development. One of the participants then referred to the imaginary of visual art education as being about the knowledge of the hand:

> It feels a bit strange [to work only with digital technologies] because you have a certain imaginary about art education… the argument for keeping those technologies would be to work physically with things, this hand-brain thing. Maybe part of that gets lost. (*Extract from workshop, SE*)[266]

For the participants, as previously discussed, thinking with hands is connected to older cultural techniques whereas digital tools are understood as partly immaterial, or at least with a bias towards the cognitive. Recognizing the inevitability of digitalization, one participant put forth maker spaces as a way to bridge the gap between the knowledge of the hand and the digital.[267] Others put their hope into technology development, as in another Swedish workshop where the participants engaged in a vivid discussion about pressure sensitive tablets and screen covers mimicking the feeling of paper

—

[263] iS9

[264] With the exception for one participant in wsS1 and one in wsS4.

[265] wsE3

[266] wsS4

[267] iS12

"to escape the feeling of drawing on glass" as a way to save the embodied skills and techniques associated with arts and crafts education. They further put forth the need for this kind of knowledge as a *shared vision,* at least in the art teacher community:

> People have a need for the tactile and the touch of the hand should be there, in the digital, and in a way technology development goes forward by looking backwards. It is really fascinating to see because it shows that technology builds on some kind of human needs. Sometimes, if you are afraid of future technologies which seems to be really common… I can also feel like that sometimes, like "should we use 3d printers? but then we don't need crafts!" but when this kind of development gets closer, you really feel that there is something important with the hand, that you want to keep, that *everyone* wants to keep. (*Extract from workshop, SE*)[268]

This imaginary of future technology development as making the world more "what it was meant to be all along" (Marvin, 1988, p. 235) is in line with what Bolter and Gruisin (1999) refers to as a *desire for immediacy*, where "the medium itself should disappear and leave us in the presence of the thing represented" (p.6), only here it is not only a way to get closer to the image but also to the very act of image making. From this perspective, the maker space suggested by another participant becomes a remediation of the artisan workshop, a fixed space where skills, technology and ideas come together. The participant suggesting maker spaces as ways of combining the knowledge of the hand with digital technology especially emphasized that they must be situated within the school and made available as a resource for teachers and students at all times in order not to "destroy creativity", which would be the case if they had to exit the school building and become limited by certain time slots. The desire to get closer to old techniques of the hand also expresses a desire to mediate *touch,* described by Peters (1999) as the sense "most resistant to being made into a medium of recording or transmission" (p. 269) and to overcome the perceived focus on vision associated with digital technologies, discussed in chapter five.

To sum up, there seems to be a strong imaginary among art teachers about the art classroom as a hub that connects knowledge forms and subjects in an otherwise fragmented educational system. At the same time, there is a tension between this connected and open classroom on the one hand, and the art classroom as a specific space within the school where

—

[268] wsS3

certain kind of learning processes take place, on the other. In Kirkeby's (2006, pp. 83–84, 123) terms, the art classroom as a *social space*, gathering ideas and people and structuring processes of knowledge production and communication clashes with the vision of the art classroom as a *conveyor of atmosphere*, described by participants as an intimate "room for the senses"[269] that has the "air of a studio"[270].

Although the idea of the art classroom as a hub where people, ideas and things come together *in* the classroom prima facia opposes the imaginary of the mobile classroom suggesting an *outward* movement, they can also be seen as two sides of the same coin. This duality is also described in *City as classroom* (McLuhan et al., 1977), where the authors suggest that "in an age when answers are being discovered outside the classroom, questions belong inside the classroom" and that the title of the book should perhaps be inverted into "the classroom as city" (p. 165). Far from being mutually exclusive, the metaphor of the city as classroom and that of the classroom as city emphasizes the need for schools to engage with the surrounding community, but at the same time puts forth schools as central nodes for knowledge production, discussion and civic participation. This covers both conceptualizations of the future classroom presented in these first two sections: the mobile art classroom where artefacts, materials, tools and people can be moved out of the classroom to explore contemporary culture, society and nature, and the art classroom as a hub, connecting people, ideas and questions from the surrounding "city". The next section reflects on the consequences of the connected and expanded classroom, that in McLuhan's (1960) terms have "cracked the very walls of the classroom so suddenly that we're confused, baffled" (p. 1). This "classroom without walls" opens up to the world, offers possibilities for collaboration and for showing the work performed in schools, at the same time as it enables control and surveillance and stands in stark contrast to the immersion and autonomy associated with creative work.

7.2.3 Classroom/glass room

The previous chapter described how art educators use their infrastructural imagination to uphold working routines in the classroom and to process distinctions, between inside and outside, art and other subjects. For Siegert (2015), the distinction between inside and outside upheld by doors can be

—

[269] wsE3

[270] iS5

extended to that between public and private and eventually to an asymmetry of knowledge. "In this way", he writes, "doors are crucial actors in the distribution and circulation of knowledge. In modern concrete buildings, however, doors have surrendered that function to walls" (p. 201). But if walls are replacing doors, what happens to the distribution and circulation of knowledge in a classroom without walls?

In the classroom maps from the workshops, the border between the classroom and outside space is depicted differently in different maps. In the first image from the left below in figure. 18, the classroom indeed has both walls and doors that open manually. The outside space, explained by the participants as "a little garden, that is also a kind of classroom" is not part of the classroom map but placed as an extension of the space.[271] In the second picture, previously discussed in relation to working with zones in the classroom, the doors are replaced with a wall consisting of high windows that can be opened to enable passage between inside and outside.[272] In the third image, there are no distinctions at all between outside and inside space, or in fact between exterior and interior, since the map also displays the outside of the school building.[273]

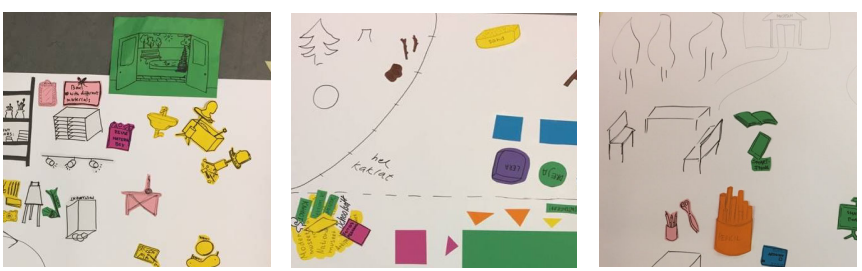


Figure 18. Art classrooms with and without walls. Photographs from workshop maps.

If doors are media that process and thematize the difference between inside and outside, between knowing and not knowing, these representations can be read as different stages of connectedness and transparency. The presence or absence of doors in the maps, if they are made from glass or wood and if they can be closed or not, shows an ongoing negotiation between visual arts education as an autonomous subject with a distinct tradition of knowledge production and of art as a more general approach to the world that can be included in several subjects and areas of society. "The membranes around

—

[271] wsE4
[272] wsS2
[273] wsE3

the institutions are thinning" as Meyrowitz (1996, p. 99) describes it, referring to the drive to open the classroom and move away from traditional subject distinctions.

One aspect of working in a classroom that figuratively speaking lack walls or only has thin "membranes", is that it is possible not just to look out for inspiration, but also to look in and observe what is going on in the classroom. As discussed in chapter six, visibility is a double edge sword. While the visualization of work and knowledge has been an important way for art educators to gain legitimacy for their subject, visualization also enables surveillance and control (Star & Strauss, 1999, pp. 9–10). But transparency is not only a metaphor, it is also a feature of modern architecture with its penchant for glass walls and windows. Benjamin (1996, p. 734) famously referred to glass as "the enemy of secrets", and architect Helena Mattsson writes on the topic of architectural transparency that open workplaces not only make visible and aestheticize previously hidden work, but also open up for mechanism of control:

> It would not be far-fetched to look at the contemporary deployment of transparency, which opens up closed organizations and reveals their inner functions and organs, as a kind of exhibitionist regime that located the individual within a polarized desiring structure, "to be seen" and "to see" thus also always has "to be controlled" and "to control". (Mattsson, 2010, p. 197)

Transparency here can be understood in two ways: as a metaphor for visibility and openness, what Kirkeby (2006, p. 115) call *space as a conveyor of meaning*; or as another kind of *behaviour regulating space* that literally enables surveillance and control, not primarily of the students but of the teachers and what they do in the classroom. These analytical spaces coincide in the physical art classroom where, for example, glass doors or windows into the classroom function both as a symbol of openness and as a way for management, parents or colleagues to actually see what is going on inside the classroom (Fram & Margolis, 2011, p. 241). For some of the participants, this possibility of control is perceived as problematic in relation to the messy work processes of creative work, "because sometimes you might do something really absurd, but that might be good for the students to get started with the creative process, but you really don't want to have to explain it to anyone" as one of them put it. In the same workshop session, one of the participants was very silent to begin with, but all of a sudden interrupted a discussion asking, "Can I say something?" then explaining

that the reason she volunteered to participate in the workshop was to explain how she felt about classrooms with glass walls:

> **Participant 1**: I remember I talked recently with one art teacher…she is not currently teaching but she did a year ago or something… and she said that she hates when new school buildings are built with walls made from glass, because she feels like it is almost impossible to teach in this kind of classroom, and people actually disturb you. And also, there is no kind of atmosphere anymore, even if nobody is watching you, you have this feeling that somebody is watching you because of the glass walls. She also said that she remembered when she was learning art, the classrooms had no glass walls, but at the moment she goes to a higher art school in Tartu where they have a new building and she feels like even learning in this classroom is very hard, because teachers don't have this… basically, what I want to say is that if you are learning and teaching in this kind of classroom you don't have this intimate… you don't feel free.
>
> **Participant 2:** It is like a word game I think… classroom and glass room! (*Extract from workshop, EE*)[274]

For the first participant, the possibility of being watched was enough to control and limit her behaviour. These panoptic features can also be found in the extended classroom where learning platforms and demands of documentation offer the same kind of metaphoric and literal transparency as a classroom with glass walls, opening up the learning space for parents and management, both as a kind of conscious display and as a form of control. In this way, the metaphor of the glass room aligns with the previous discussion about the dynamics between invisibility and visualization in relation to school digitalization and professional autonomy. Although related to digitalization, these demands of visibility and predictability also occurred prior to the introduction of digital systems in education, but have become more dominant with the advance of soft and hard infrastructures for monitoring and control. One participant describes it as "both a resource and a dilemma, that this transparency has become dominant", but is also careful to point out that the phenomena is older than digitalization. By comparing digital learning management systems to the use of whiteboards to state in advance what will happen during a lesson and what the pupils are expected to learn, the same educator also shows the intimate connection

—

[274] wsE1

between the spatial configurations of the classroom and the design of digital systems.[275]

Indeed, all conceptualizations of the classroom discussed in this chapter can be connected to imaginaries about media technologies in education. The theme of the *mobile classroom* looks at teachers attempts to break out of the classroom, and with that the traditions, expectations and limitations of traditional art education. Mobile digital technologies are here understood as making this break-out possible by offering possibilities to bring along tools and devices for image making. Envisioning the art classroom as a *hub* rather emphasizes the potential of digital media to bring "bring the world" *into* the classroom (Good, 2020), facilitating collaborations and transdisciplinary projects This conceptualization is connected to a future imaginary of visual arts education as a way to re-connect knowledge forms and subjects separated through curriculum fragmentation as well as bridging the gap between school and society/culture. The third theme problematizes the openness and transparency associated with digital technologies by putting forth intimacy and seclusion as important in creative work. Digital platforms for administration and monitoring are here equated by the participants with working in a *room with glass walls.*

Some of these imaginaries are in line with the dominant sociotechnical imaginaries surrounding school digitalization, whereas others challenge them and point to new ways of understanding the relation between education, technology and community. The following chapter is a concluding discussion about how these visions, along with material from the previous chapters, respond to the research questions asked in this study and how these results might be used to inform media literacy education in the future.

7.3 Summary

- This chapter discusses how art educators imagine the future of the subject in relation to media environments and infrastructures and put forth digital media as part of the spatial configuration, infrastructure and "hidden curricula" of schools.
- By recognizing the relation between hard and soft infrastructures for education and reconfiguring the classroom to fit the curriculum or their own pedagogical beliefs the participants in

[275] iS3

this study challenges the idea of the classroom as a "hidden curriculum".

- The participants emphasize the potential of visual arts education as connecting different school subjects and forms of knowledge as well as the importance of interacting with the surrounding society, but also identifies a risk of losing autonomy if the subject becomes too interdisciplinary.
- They further recognize the increased demands of transparency associated with contemporary school architecture as well as with digital monitoring systems, and discuss this as problematic in relation to creative processes.
- This ability to recognize and reimagine the relations between spatial infrastructures, digital technologies and educational imaginaries and opens up for counter visions again dominating sociotechnical imaginaries in the school digitalization debate.

CHAPTER 8

Towards infrastructure literacy in visual arts education and beyond

The main aim of this study has been to *understand how media used within visual arts education in Sweden and Estonia are connected to different traditions and ideas about education, and how art educators understand and navigate this relation*, by tracing some of the connections between teachers, classrooms, media technologies, cultural techniques, soft infrastructures and educational imaginaries at play within the subject. In chapter five, this is done by discussing how certain traditions of visual arts education are connected to the organization of the classroom as well as to the curriculum and the educational background of teachers. Chapter six further shows that art educators in this study are well aware of these connections and can act on them in line with their own pedagogical beliefs, and chapter seven explores the art classroom as a place to imagine alternative configurations and futures for the subject. This chapter, in turn, asks which connections exist today and how it is possible to create literacy around them.

The chapter begins by summarizing the main findings of the study and how they contribute to media studies. In a second step, it draws on these results to meet the secondary aim of this study, to discuss *how media education can be developed and implemented in compulsory education to respond to the challenges and possibilities of contemporary media culture.* Based on the previous analytical chapters, describing how art educators repurpose and bypass existing educational infrastructures as well as develop and imagine new ones, it asks how these abilities can be articulated into pedagogical approaches. In line with research promoting *infrastructure literacy*[276]

—

[276] Including related concepts such as *data infrastructure literacy* (Gray, Gerlitz, & Bounegru, 2018; Hartong & Förschler, 2019) or *infrastructural competence* (Sawyer, Erickson, & Hossein Jarrahi, 2019). The proposed framework also shares some characteristics with the concept *medium literacy*, proposed by Meyrowitz (1998) as a conception of media literacy focusing on media as environments and how they have emerged historically.

(Mattern, 2013; Parks, 2010), the chapter thereby endeavours to contribute to a discussion on how media pedagogy in the compulsory education can be reshaped and broadened to include infrastructural perspectives on media, used both within and outside the school system.

8.1. Looking back: Concluding discussion

This dissertation has discussed the relation between media environments and visual arts education, and how art teachers understand, use and reconfigure media technologies and systems to maintain, negotiate and challenge specific traditions within their subject – in other words *how teachers enable media and how media enables teaching*. By comparing visual arts education in two different settings it has shown that the subject can be defined both as a *technology in itself*, facilitated to produce certain kinds of subjects and futures, and as a school subject historically *shaped and defined by media* in the broadest sense possible, from tools and techniques to hard and soft infrastructures, such as housing or written standards. It further shows that art educators make up crucial actors in this process, by configuring media technologies and systems to fit local conditions and also through the development of new infrastructures.

This subchapter summarizes the main findings of the study and discusses how it contributes to media studies. It starts by answering research question 1) "How do media enable visual arts education in Sweden and Estonia?", followed by research question 2) "How do art educators in Sweden and Estonia understand and enable media?". These results are then summed up in 3) a discussion about the contributions and limitations of the study, as well as some implications for further research.

8.1.1 How do media enable visual arts education?

To answer this first research question, the dissertation used both a historyicizing perspective – looking at how visual arts education has been perceived in the past and how this past is part of the present, and a more ethnographic approach – examining how different media enable certain practices within the subject today. In the latter case, participants in this study have highlighted how different media makes possible different kinds of thinking, and thus different conceptions of visual arts education, as well as how the subject is enabled through *built environments* such as classrooms, museums and online communities, *logistical media* (Case, 2010; Peters, 2015b) such as painting mediums, photocopiers and learning mana-

gement systems, and *older media* such as books or darkrooms. The historical overview of how visual arts education has developed in Sweden and Estonia in turn, shows that the subject has been shaped in relation to certain *second order techniques* (Macho, 2013), from industrial drawing to mass media production and digital visual communication. Some of these re-conceptions are also reflected in the naming of the subject, from *drawing* via *draughtsmanship* to *art* in Estonia and from *drawing* to *image* in Sweden.

The transition from manual skills training to a more theoretical communication subject is often discussed as a major shift in dominant narratives of visual arts education, in both Sweden and Estonia. This idea is based on the assumption that older cultural techniques are not media, and if they are, they differ fundamentally from new media technologies. At the same time, the participants stress how the subject has always been related to communication in some way. This positioning of visual arts education as *always already a media subject* to some extent challenges the notion of a radical rupture in the development of visual arts education. Although there has been a shift in focus when it comes to how the subject is conceptualized and understood, roughly as a move *from techniques to outcomes*, this is not due to the characteristics of new, digital media or contemporary media culture. In contrast, this dissertation argues that new media is a return to old media, with an emphasis on organization and orientation over content. From this perspective, 3D modelling as a cultural technique that thematizes space has more in common with old techniques such as line drawing than with the production and interpretation of mass media content, which rather invites a semiotic approach to culture.

In addition to being a school subject shaped by media technologies, visual arts education can also be understood as a *technology in itself*, used to achieve certain ends. The ways in which visual arts education has been deployed as a technology is in turn closely connected to the material technologies and techniques that make up the subject at certain times. Drawing was used in the early public school as a disciplinary technology to help children develop precision and diligence. Later on, painting, clay sculpting and other techniques associated with self-expression and play have been used as a mean of recreation in between more theoretically demanding school subjects with the aim of improving well-being among children and young people. Today, digital competence is taught across the curricula as a mean of employability and consumer knowledge. This dynamic between media technologies *in* visual arts education and art education *as* a technology is made visible in this study through the comparative perspective. With

the formation of the Soviet Union after the Second World War, the Estonian and Swedish school system develops differently due to the shifting political context. In Estonia, visual arts education went from a broad aesthetical subject to a means of producing good Soviet citizens and a technically skilled workforce. During the same period in Sweden, a leftist turn in society emphasized visual arts education as critical consumer knowledge and a means of civic communication.

In opposition to these administrative uses of visual arts education is the idea of *art as an end in itself*, closely connected to the concept *Bildung*. This tension is reflected in the complex identity of the subject in both countries. At present, visual arts education in Sweden is conceptualized as a communication subject while the subject in Estonia is oriented towards contemporary art. In both settings however, traditional techniques still make up a big part of the teaching, which could be understood as a maintaining of an independent subject identity, challenging more instrumentalist visions of education. This desired conception of the subject as *Bildung*, is enabled through time-bias media such as museums or a well-equipped art classrooms, as well as through spaced-bias media, such as the textbook (Innis, 1951). Participants stress the importance of having access to several textbooks in order to compare information, and of museum and gallery visits to get a sense of belonging and encouraging further interaction with the art scene. In contrast, online resources and social media networks are seen as limiting perspectives and enabling template based "cookie-cutter-art".

Visual arts education as an end in itself is also enabled through different artistic techniques, often put forth as a specific form of knowledge and knowledge production. This perspective is discussed in this study using the Greek term *technē*, often translated as art or craftsmanship but also signifying the gaining of knowledge through artistic practice (Bolin, 2012; Geoghegan, 2013; Heidegger, 1977). It opposes the idea of thinking as a mere cognitive process and instead emphasizes it as something embodied that takes part in relation to materials and environments. Technē is further connected to the idea of revealing or bringing forth truth about the world. From this perspective, the emphasis on handmaking in visual arts education can be understood not only as resistance against more instrumentalist approaches to the subject, but also as a way of exploring an environment and making it visible to others.

A more pragmatic view on the persistence of old cultural techniques in visual arts education is that they remain within the subject because they are physically present in spaces where education takes place. The *art classroom*

is discussed in this dissertation as an archive of obsolete media, but also as a medium in itself, prioritizing certain modes of educational practice. This emphasis on locality is interesting in relation to the debate on the ubiquity of media, characterizing much contemporary scholarship as well as older medium theory literature. While the latter have described schools as part of a larger media ecology that is being reshaped in correspondence with changes taking place outside the classroom, this study argues that the presence of media in local school contexts is equally important. This also applies to seemingly ubiquitous media, such as the digital media systems for the monitoring of educational results that are being implemented in schools worldwide but configured differently depending on the local context. Put differently, the conceptualization of *schools as media environments* in this study should not be understood metaphorically, but as an empirically grounded definition of learning institutions as specific sites of media related negotiations and work. The role of educators in this process is discussed in the following section.

8.1.2 How do art educators enable media?

From the definition of technē as a mode of knowledge production as well as a revealing of the truth it follows that visual arts education, based on techniques of the hand, holds a potential when it comes to understanding and visualizing the media environments of schools. Part of the art teaching profession is to understand the interaction of media, techniques and environments in creative processes and to create situations where this relationship can be explored by students. Another, more mundane part, is to organize everyday work with regards to the conditions that apply to their specific context, including class size, lesson time, the storing of student work and communication with students and parents. This ability to recognize and act on the media environments of education is discussed in this dissertation as an *infrastructural imagination* (S. J. Jackson et al., 2007), that includes both hard infrastructures (such as classrooms and media technologies), and soft infrastructures (such as curricula and professional language).

To begin with, art educators in this study recognize the enabling qualities of media, such as the relation between cultural techniques and knowledge production, as well as how the classroom as a media environment prioritizes certain modes of thinking and acting. This transforms the idea of the classroom as a "hidden curriculum" (P. W. Jackson, 1990; Prosser, 2007) – implicitly imposing traditions and behaviours onto students and teachers – to a *visible and partly accepted curriculum*. Although recognizing that the

media environment in which they operate might not accommodate specific needs of their subject or align with their pedagogical beliefs, art teachers make up for malfunctioning infrastructures by acting as infrastructures in themselves or by performing *articulation work* (Bowker & Star, 1999, p. 310; Star & Strauss, 1999; Suchman, 2002) to make standardized technologies and systems fit with established educational practices. These practices again reflect visual arts education as both a school subject shaped by media technologies and as a technology in itself. In the first case, *educators enable media technologies and systems through workarounds and manual configurations*. In the second case, *art educators enable contemporary educational politics through fabrications* (Ball, 2006) of pedagogical practice, produced in accordance with perceived demands on accountability and visible learning. This is related to the development of a professional language, a specific kind of articulation work that manages the demands of fitting the subject into the framework of contemporary learning, at the same time as it can be used to motivate the relevance of the subject for management, parents and even students themselves.

While articulation work is performed by educators in both Sweden and Estonia, the strategies behind these practices differ between the nations, due to disparate experiences of professional autonomy and state control, where participants in Estonia express a more distant relation to standardized systems and guidelines than their peers in Sweden. In the Soviet era, the Estonian school system was subsumed under the Ministry of Education in Moscow and checks were made to ensure that teachers followed a detailed curricular package, including not only what to teach about, but also which methods and textbooks to use (Krull & Trasberg, 2006; Pilve, 2014; Tuul et al., 2011). Participants in this study describe a "double entry system" where teachers reported in accordance with the prescribed curricular package, but organized their actual teaching more freely. In contemporary Estonia, this relaxed relationship with national guidelines is reflected in the parallel system of Estonian language and Russian language schools, where the latter have been resistant to educational reforms and changes in curricula. It is further argued in this dissertation that the lack of material resources during the Soviet era created a culture of repair that is useful when it comes to reconfiguring teaching spaces and making up for insufficient resources (Gerasimova & Chuikina, 2009). This experience is also shared with educators in Sweden due to the comparatively low status of the subject, and several teachers report being left to figure out how to make things work, without support from management.

Art educators also enable media through more subversive practices of *infrastructuring* (Bowker & Star, 2002; Karasti, Pipek, & Bowker, 2018; Karasti & Syrjänen, 2004; Pipek & Wulf, 2009; Velkova, 2017), where both past traditions and contemporary educational imaginaries are being negotiated through the repurposing of old infrastructures or the development of new ones. This dissertation shows that the past can function as an infrastructure in itself, as residing structures that underpin contemporary practice and at the same time something that can be used to challenge and reshape traditions. In the material collected for this study, this comes across both in the tendency to maintain and develop certain techniques and as a meta reflection on past traditions and established narratives among educators in both countries. Participants further recognize the art classroom as a preservative space, harbouring media technologies and material associated with past traditions and also prioritizing certain modes of communication and teaching. Some participants use these old cultural techniques to make visible and thematize established genres and conventions, while at the same time maintaining a specific subject identity, while others regard the structuring qualities of the art classroom as more problematic and promote an interdisciplinary approach, where visual arts education also takes place outside the school building and interacts with the surrounding society. These strategies reflect a tension within visual arts education, as on the one hand a broad and interdisciplinary subject with the potential to connect knowledge forms, and on the other hand a specific tradition that risks getting diluted if it becomes too general and interdisciplinary.

To promote certain perspectives on what the subject should be or do, art educators in this study also describe the development of new infrastructures and meeting places, outside official decision making-processes and structures. This *shadow development* (Mattern, 2015, 2016) includes spatial configurations, such as the restructuring of classrooms to better correspond to how teachers imagine the subject, as well as communicative and virtual configurations such as teaching material and online communities. The latter also reflect the shifting strategies of invisibility characterizing the infrastructuring of art educators, who on the one hand strive to make their work and subject specific knowledge visible to others, and on the other hand enjoy the freedom of being a marginalized – and to some extent invisible – school subject.

8.1.3 Contributions, limitations and further research

In addition to the didactic contribution discussed in the next subchapter, this dissertation has added empirical knowledge to the field of media studies about the relationship between media, education and teachers. The reshaping of schools in relation to the surrounding media environment was a major concern in medium theory, but without taking local specificities or the work of teachers into account. In contrast, contemporary studies on media infrastructure have been keen to emphasize locality as well as the human labour that goes into the maintenance and development of infrastructures, but have paid little attention to schools as media environments. By emphasising the specificities of visual arts education as well as the differences between Estonia and Sweden in how teachers relate to media within their subject, this dissertation puts forth educational systems and environments as relevant to media studies and contributes with an empirical material on how the media technologies and soft infrastructures of education are reconfigured locally, both with regards to national contexts and school subject cultures.

The dissertation further contributes with methodological development on how to study these environments. Arguing that terms such as "media" or "technologies" tend to orient participants towards newness and best practice, it introduces two methods aiming to achieve an *infrastructural inversion* (Bowker & Star, 1999) that can be used to supplement more traditional approaches such a interviews and field work, namely *video walks* (Pink, 2007) and participatory *future workshops* (Jungk & Mullert, 1987) based on drawing. These methods have been valuable for me as a researcher in order to focus on specific aspects of the research problem, and moreover they were perceived as interesting by the participants. The latter applies especially to the workshops where student teachers were asked to reflect on how they would want visual arts education to develop in the future and to collaboratively design an art classroom based on these imaginaries. According to several participants, the workshop sessions became an opportunity to discuss aspects of their future profession that are rarely brought up or thoroughly considered during their training. Future workshops as a method to facilitate discussion about media environments and education may then be advantageously used, not only as a research method in media studies, but also as a seminar form in teacher training and in the professional development of teachers.

Theoretically, the dissertation contributes to the tentative research paradigm *infrastructuralism* (Peters, 2015b), by developing a conceptual framework around the understanding of media as enabling environments that combine the historicizing perspectives from Germanophone media theory and medium theory with the emphasis on locality and human agency from STS and infrastructure studies. This has allowed for a more nuanced understanding of schools as complex sociotechnical systems where media is understood, used and reshaped by teachers in their specific, historically conditioned, context. The dissertation further contributes with conceptual development of the term *articulation work* (Bowker & Star, 1999, p. 310; Star & Strauss, 1999; Suchman, 2002), as in addition to meaning invisible work performed to "make things fit", also contain an element of articulation or making work visible.

There are also some limitations to this study that need to be acknowledged and that call for further research. To begin with, a comparative study that includes two nations, several institutions, a historical perspective, a complex methodological package and a very broad definition of media, is bound to result in a vast and quite messy corpus of material. It also means that only some aspects of these environments can be explored and analysed in detail. To better comprehend the role of media in education, it must be explored in greater detail and depth. To begin with, a refined historical study on the interplay between soft and hard education infrastructures would be a valuable contribution to get a deeper understanding of how these processes have shaped education. More comparative research is also needed in order to get a broader picture on how this is played out in different cultural contexts, such as other schools subjects, national settings or institutions. Another promising line of research would be to explore how other professional groups understand and enable media in education, such as technical support officers or procurement managers.

The more interventionist methods used in this dissertation could further be refined by being tried out and developed in relation to other research problems. In this study, each video walk or workshop session took place only once with the same participants which limited the possibilities to deepen and follow up discussions. Having recurring sessions with the same groups would make better use of the participatory potential of these methods, and probably also provide a more fine-grained material for the researcher to work with. Another exciting possibility would be to adjust these methods to suit media research with children and young people, as a way of enhancing participation and involve them in the analytical process.

A third perspective that is present but underdeveloped in the final discussion is how an understanding of media as enabling environments relates to environmental issues and sustainability in a broader sense. If we take seriously the idea that all cultural techniques, from agriculture to AI, are to some extent in the business of processing distinctions between nature and culture, then the difference between media and what we call nature becomes blurred. This is addressed in media studies discussing media as a way of managing nature (e.g. Carse, 2012; Edwards, 2003; Peters, 2015a), as well as the resources and environmental impact involved in the production of media devices (e.g. Miller, 2015; Parikka, 2015; Parks, 2015b), but is less prominent in media education research and praxis. An existing contribution to this field would be research that advances the idea of media as nature and of nature as media and which explores how this can inform media education, thereby making a bridge between media literacy initiatives, environmental education and climate awareness.

To conclude, the main arguments made in the discussion above is that visual arts education is a media subject in the sense that it is has been shaped and re-shaped historically with the advance of cultural techniques for image making, but also that it has been used as a technology in itself to achieve certain ends. Media thus enables different conceptions and uses of visual arts education. Educators, in turn, enable the spatial, material and discursive configurations – or infrastructures – that make up the subject. By extension this also means enabling an administrative use of visual arts education as technology for producing certain kinds of subjects and futures. However, art educators also act in conflict with dominating *sociotechnical imaginaries* (Jasanoff & Kim, 2015) by bypassing, negotiating or configuring these infrastructures to enable practices where visual arts education makes up an end in itself.

The second half of this chapter suggests that these results can be used to reconceptualize visual arts education as a media literacy subject. Starting from the notion that new media return us to old media, the emphasis on handmaking or technē in the subject can also be used to bring forth and discuss media that do not necessarily have a content, but that structure and organize other media and everyday experiences, such as algorithms, satellite technologies and classification systems. It further suggests that the emphasis on repair and reuse in the subject can be used to engage with older media technologies, as a way of both understanding how they underpin and shape contemporary media technologies and provoking discussions about environmental sustainability. The abilities involved in recognizing and exploring

media as enabling environments is conceptualized in the last subchapter as *infrastructure literacy* and put forth as a supplementing perspective to the semiotic approaches to visual mass media content that currently dominate media literacy initiatives within visual arts education.

8.2 Looking forward: What is infrastructure literacy?

The results of this study show that while media in the broadest sense structure and condition education, these systems, technologies and spatial configurations are also enabled by the creative work of educators. However, this sensibility to infrastructures and ability to negotiate the relations emerging from them is expressed by the educators in this study *mainly* through articulation work and other practices aimed at keeping environments and infrastructures running and invisible, and not as a critical orientation that can be articulated and passed on to students. This subchapter takes this paradox as its point of departure and returns to the theoretical framework to discuss how the *infrastructural imagination* (S. J. Jackson et al., 2007) of educators could be facilitated to create pedagogical situations where students can develop *infrastructure literacy,* defined here as a multifaceted set of skills and knowledges including:

- the ability to make infrastructures visible and intelligible through different techniques
- the ability to understand and an analyse the socio-political, technological and economic structures involved in the emergence of infrastructures, and
- the ability to use and re-purpose existing infrastructures as well as imagining and creating new ones.

The subchapter is structured in three sections, starting with 1) a discussion on how a historicizing perspective on schools as media environments can challenge the presentism of the current digitalization debate and encourage discussions on sustainability, followed by 2) a section on how the drive in medium theory to make environments visible might fit with the idea of visual arts education as a visualization subject, and finally 3) a call for critical perspectives in media education on the digital systems, devices and software used *within* education and how they are connected to larger process of technology development informed by sociotechnical imaginaries.

8.2.1 "The future is a thing of the past"

As discussed in the introductory chapter, this dissertation connects to the body of work on formal education within medium theory, including that of Marshall McLuhan (1960; 1977) with writings on the classroom as a media environment. In an article from 1981, McLuhan's earlier student Walter Ong describes this interest in knowledge processes and pedagogy not as a side-track in McLuhan's oeuvre, but as a central theme that infused everything he did. Ong also claims that it is this interest, combined with a focus on media and a historicizing perspective, that has lent the prophetic qualities to some of McLuhan's work:

> He of course never claimed this ability [to foresee the future] at all, but the reason this impression might exist is suggested by two factors I have discussed – his deep sense of the relevance of the past to the present and his interest in knowledge processes. When these were combined with his later concerns with media, you had an exciting triad – especially if you remember that, as I believe he has insisted, *the future is a thing of the past*. (Ong, 1981, p. 134, emphasis added)

To understand how contemporary technologies shape individual thinking as well as interpersonal imaginaries about the future, Ong and McLuhan pushed the need for exploring the past and the relation between societal change and the introduction of new communication technologies. This perspective is to a large degree missing from the contemporary digitalization debate, portraying a society in radical transformation to which schools must adjust in order to remain relevant (c.f. Selwyn & Facer, 2013). In this vision, media is something novel that enters the school system from the outside and revolutionizes it but, as Breiter (2014, p. 289) points out, schools have always been "mediatized worlds". Desks, books, pens, grades, school uniforms and electric light have all been part of shaping contemporary school systems, at the same time as the introduction of different media in schools are informed by certain visions of what education is and should do, what kind of subjects it should produce and for what kind of future (Erixon, 2014; Lawn & Grosvenor, 2005; Sørensen, 2009). These imaginaries, in turn, differ between Sweden and Estonia, showing the need to take cultural specificities into account. It is only through such historical and local perspectives that it is possible to gain a deep understanding of what the introduction of new technology means, as Estrid Sørensen concludes in her book on the materiality of learning:

> How new technologies contribute to forming new educational practices can only be fully understood on the basis of a detailed analysis of how contemporary or past materials shape such practices. (Sørensen, 2009, p. 191).

Understanding the impact of older school media on how education is imagined and practiced today is also a way to bypass both the presentism and the technological determinism characterizing contemporary digitalization discourse. Following the framework of studying sociotechnical imaginaries suggested by Jasanoff (2015b), such an approach would take into account the *origin* of certain educational imaginaries, how they have emerged in the relation between social arrangements and scientific development, as well as how these imaginaries become *embedded* in built environments, media technologies, hard and soft infrastructures. This means recognizing the *path dependency* of infrastructures, that is, how new systems are built on an installed base (Bowker & Star, 1999, p. 35; Mattern, 2015; Star & Ruhleder, 1996), in this case how educational technology is developed in relation to established categories and ways of organizing education. One example of this is how the metaphor of the classroom recurs in learning management systems and digital tools, or how established categories of school subjects still structure everything from the school building to curricula and educational material.

But the past also functions as a kind of infrastructure in itself, as shown in chapter five where past traditions were employed by participants in both Estonia and Sweden to motivate current pedagogical approaches and beliefs. In a similar way, the past is often constructed in contrast to current developments in technology and digitalization policy creating "consensus and legitimacy around the construction of particular problems to which they [tech companies] also offer solutions" (Williamson, 2013, p. 43). In other words, a historicizing approach to school digitalization includes understanding how such standard narratives of the "problems" of contemporary education were constructed in the first place, as well as how they have become taken for granted (Bowker & Star, 1999, p. 41; Peters, 2015b, p. 35). For Jasanoff (2015b), the study of what is taken for granted and the negotiations involved in this process is what ultimately "makes possible a study of alternative futures" (p. 339). To repeat the phrasing of some of the educators in this study about the importance of understanding how the educational system and different school subjects, as well as technologies and tools, have emerged historically: "if you can look back, you can also look forward" and "technology development goes forward by looking backwards".

As shown in chapter five, the educators in this study to a large extent have this historical perspective and use it to understand and configure visual arts education in the 21st century. This comes through in discussions about the subject and also to some extent in pedagogical practice, where old techniques, technologies and themes are used and repurposed. In this section, I would like to expand on one of these approaches, namely that of *media archaeology* and discuss to what extent it can be employed as a more systematic and conscious pedagogical method for developing infrastructure literacy. Promoted by researchers as an *artistic methodology* with pedagogical potential "educating us about technology and media, not only as critical consumers who can hermeneutically interpret complex media content but also as producers who can actively engage in various media practices" (Parikka, 2012, p. 157) artistic media archaeology might offer a much needed complement to existing media literacy approaches within visual arts education, concentrated on the interpretation of visual messages.

The idea of hands-on engagement with technology as a way of challenging the division between developers and users of technology also comes across in the empirical material in this study, where concepts like DIY and makerspaces are discussed as a possible future path for visual arts education. What an emphasis on media history and obsolete technology can add to these approaches is an increased understanding of the contingency of technological development. Engaging with older media technologies in the art classroom might provide perspectives on the supposed newness of digital culture and technology and challenge the idea of history as linear development and progress. In Jussi Parikka's (2012) words, it "offers a 'what if' view to media culture, and engages with alternative histories as a resource for understanding the assumptions concerning media technological innovations" (p. 43). Put differently, excavating and repurposing older technologies in visual arts education can function *both* as a way to understand the principles behind a certain media technology and to, so to speak, bypass the *infrastructure concealment* (Parks, 2010, para. 10) surrounding its digital incarnation (such as how one workshop participant suggested dismantling an analogue camera to make visible how photography works) *and* to show that things could have been otherwise, and that the development of digital technology by no means is predetermined or autonomous.

One participant in this study talked about "art as remida" to describe the use of discarded commodities in creative processes. This has been an established practice within art since the early 20th century when dada artists such as Duchamp started exhibiting manufactured objects as readymade

sculptures, followed up by the emphasis on found objects in the Arte Povera movement in the 1960s (Hertz & Parikka, 2012, p. 426; Miller, 2015, p. 146). Today, the repair and repurposing of digital devices can also be used to address environmental concerns related to media technologies, as an educational approach to provoke "discussions about fair technologies and harmful production and disposal processes of media devices" (Kannengießer, 2020, p. 133). Engaging with or "repairing" discarded objects can also further an understanding of planned obsolescence or the conscious limiting of a product's lifetime as something that "takes place on a micropolitical level of design" through concrete choices in the construction (Hertz & Parikka, 2012, p. 426). When devices stop working and cannot be fixed or reused, they end up as landfill, leaving behind toxic components, while the production of new technological devices to replace the discarded ones advances the depletion of natural resources and the release of carbon emissions.

As discussed in chapter six, participants in this study related this problem to the increased demand on digitalization, where teachers are encouraged to purchase cheap, single-use, electronic components to meet the demands for digital competence as described in the national curriculum. Media archaeology offers one possible solution to this problem, pointing to the importance of developing certain kinds of knowledge or literacy to make possible a more sustainable media environment in the future. Hands-on and creative approaches to old and discarded media technologies might function as a way to bypass the infrastructure concealment and built-in obsolescence of different devices, making possible recycling and other kinds of sustainable media use. More importantly perhaps, it is also a way to make the logic of planned obsolescence visible, challenging imaginaries of immateriality visible in metaphors such as "the cloud" and open up a debate on the environmental consequences of contemporary cultural production within visual arts education. For Toby Miller, artistic practice is especially suited to the initiation of such a debate "to exemplify and criticize a human and ecological disaster that must not be allowed to continue":

> Artists are uniquely placed to enliven such conversations, due to the centrality of their labour process to the spread and development of a cognitariat and their self-critical complexity with the environmental peril that is enabled by digital culture. Their creative reuse of waste as art challenges our upgrade society's culture of built-in obsolescence, while the curating of such work by museums can be part of a wider commitment against e-waste. (Miller, 2015, pp. 149–150)

The next section will expand further on the invisible aspects of the contemporary media environment and the potential in art and visual arts education to bring forth or visualize them.

8.2.2 Making visible the invisible

The theoretical chapter in this dissertation took the Greek term *technē* as starting point to discuss the relation between culture, technology and knowledge production. Embodied skills and handling of technologies are not only tacit forms of knowledge that create and reproduce culture in the broader sense, but also make up ways of knowing and of *bringing-forth* this knowledge (Bolin, 2012, p. 2; Geoghegan, 2013, p. 72; Heidegger, 1977, p. 6). The potential of artistic practice when it comes to revealing otherwise hidden or obscured aspects of the lived environment is also emphasized by McLuhan (1964) who regarded the artist as "an expert aware of the changes in sense perception" and therefore capable of recognizing changes in the media environment brought by the introduction of new technologies (p. 20). The artist can further make these environments visible by creating unfamiliar situations where the familiar can appear. McLuhan (1967, p. 68) refers to these countersituations as *anti-environments* and stresses how they can be used to challenge the invisibility and ubiquity of media. Interestingly for the study at hand, "art" is not used here to refer to fine art "offered as a consumer commodity" but "as a means of training perception", as put by McLuhan in the introduction to the 1966 paperback edition of *Understanding media.* In the same passage he continues:

> And here it is that the young can do top-level research work. The teacher has only to invite the student to do as complete an inventory as possible. Any child can list the effects of the telephone or the radio or the motor car in shaping the life and work of his friends and his society. An inclusive list of media effects opens many unexpected avenues of awareness and investigation. (McLuhan, 1964, p. 10)

Art is in other words defined by McLuhan as a pedagogical practice, better suited than institutionalized art to bring-forth the "effects" of media in the broader sense. This pedagogical approach to anti-environments is developed in *City as classroom* (McLuhan et al., 1977) where the authors introduce some practical exercises to help students become aware of how our lived environments shape human cognition, drawing on visual material from the field of gestalt theory, such as optical illusions where the positive

space creates one figure and the negative space (or background) another. By training the visual perception to perceive figure and ground simultaneously, the authors believe that students will also develop the ability to analyse other situations as a whole, and not only as figures against an invisible background. Gestalt theory is also used in the book to discuss stereotypes. The cognitive phenomena where the human brain uses predefined categories and templates to effectively register shapes in the visual environment is used to explain how certain cultural tropes are repeated over and over and eventually become invisible to us (McLuhan et al., 1977, p. 29).

The use of optical illusions to illustrate a *figure-ground shift* (McLuhan et al., 1977, p. 8) or an *infrastructural inversion* (Bowker & Star, 1999, p. 34) shows the intimate connection between image making and perception, and of visual arts education as a "training of the senses" (Friesen & Hug, 2011). Changing perception is a key thing in art and art education, and one trick of the trade of figure drawing is to focus on the negative spaces around a body or object, in order not to depict something as we *think* it looks but how it *really* looks. In other words, it is a method for bypassing the stereotypes in our head by consciously switching focus to the ground. Indeed, foregrounding environments are central to most art making practices. In order to take properly exposed photographs, you need to understand the differences between daylight, fluorescent light and light bulbs and in painting you need to pay attention to how colours reflect on each other. These examples are also about training perception, not allowing the brain to compensate for changes in colour and light affected by environmental conditions. Perhaps the most basic example of how art makes environments appear is through working with shadows. By studying how shadows fall on an object or a body and on its surroundings, it is possible to say something about what kind of light is used, from how many light sources and how far from the objects the lights are positioned. As put in *City as classroom*:

> Your shadow is a visible expression of the relationship of you as *figure* to your environment as *ground*, because your shadow enables you to see some of the effects of your interaction with your environment in 'instant replay'. (McLuhan et al., 1977, p. 25)

This "instant replay" is explored in visual arts education through drawing exercises where a shape is lit from different angels and distances to show how the shadow is affected. As discussed in chapter five, shadow drawing is associated by the educators in the study with outdated, technical traditions

in visual arts education but is nevertheless a very common kind of exercise in both Swedish and Estonian art classrooms. Although visual arts education after the communicative turn has come to include a broader set of cultural techniques, including reading and writing, the visualization of psychical environments and their effect on the figure remains a central part of the subject. I would like to suggest that this aspect of visual arts education is equally important as interpretative skills when it comes to understanding and exploring the contemporary media landscape, not least given the ubiquitous character of digital media.

But visual arts education also responds to the more overarching aim of *City as classroom*, to analyse situations on multiple levels and see beyond established categories.[277] When the participants of this study discuss art as a method of exploring the world and of making taken-for-granted conventions visible, they make no clear distinction between the figure and ground relationship in physical environments and what is made visible and invisible in culture and society. The connection between seeing and making visible is also emphasized, not necessarily as a two-step process but as a method where visualizations or art can bring about a new way to understand the taken-for-granted. The same idea can be found in *City as classroom* where artistic methods such as visual ethnography, reediting of newspapers, TV news and commercials, making an old-fashioned box camera, and creating sound art and exhibitions are introduced as methods for training the students' perception and developing their understanding of contemporary media environments.

In addition to this explorative and knowledge-producing aspect of *technē*, art also includes an element of *poiēsis,* or the making of new things. Put differently, visual arts are not only about perception but also about the ability to visualize a material or an idea and make it intelligible for others. On this topic, infrastructure researchers such as Parks (2013, 2019a) and Mattern (2013) have discussed how artistic interventions can provide ways of seeing and engaging with infrastructures that escape our attention because they are too far away (such as satellites), covered or embedded in other systems (such as tubes and cables) or because they are developed and played out in-between machines (such as face recognition algorithms). Making these hidden systems visible demands more than a training of the senses, it also involves imagination, playfulness and the use of (visual) metaphors.

—

[277] McLuhan et al. (1977) were very aware of this connection and in some of the exercises in the book the reader is encouraged to seek out an art teacher for assistance (see for example pp. 28, 60).

In her text about *infrastructural tourism*, a call to "visit the sites that are producing our networked experiences", Mattern (2013, para. 5) describes how artist have developed maps, games, audio tours and field kits to encourage hands-on exploration with large scale infrastructures and built environments. This approach could also be used in visual arts education to explore the material and structural aspects of contemporary visual media culture, such as how smart phones are produced and distributed, where data is stored, how algorithms work or who owns the media platforms that are used by young people. As in the media archaeological approach discussed above, a focus on visualization of infrastructures addresses the environmental consequences of digitalization and other questions of social and global inequality. This potential is recognized by one of the educators quoted in chapter five, who talks of contemporary art and "visualization techniques" as a way of working with social relations and power structures in the art classroom.

As in all pedagogical practice, the process of, in this case, engaging with infrastructures and coming up with ways to make them visible, is more important than the finished result. Framing visualization as a pedagogical method in this way also becomes a way of addressing the concern raised by Mattern about infrastructure mapping as static representations instead of something that encourages further engagement and action:

> What do we do with all that we have discovered and identified and sensed? So you know where your Internet lives … now what? The ambitious intentions to "make visible the invisible" and raise awareness of imperceptible systems, much like Situationist-style *dérives* or interventions, can too often become ends in themselves. (Mattern, 2013, para. 32)

Indeed, if we take seriously this concern or McLuhan's (1964, p. 10) warning against turning art in to a "consumer commodity", schools would not only benefit from employing contemporary artistic methods to explore and visualize the world, they would also offer the most suitable place for the creation of such anti-environments, as an explorative practice involving young people with different experiences and from different social backgrounds.

While the mapping and visualizing of media infrastructures involves visiting places outside that classroom, art as a method of bringing forth the taken-for-granted requires close attention to familiar environments, in this case the school building and the classroom. This dynamic is the topic of the

last section of this chapter, discussing the situatedness of learning and the mediatization of education.

8.2.3 "Classroom without walls"

The future workshops conducted as part of this dissertation took the art classroom as a point of departure to explore how student teachers imagine the future of their subject and its position within the school system. As shown in chapter seven, these imaginaries included both utopian visions of a school subject connecting different knowledge forms, subjects and institutions and more pessimistic views where the increased focus on monitoring and control was seen as a threat to the messy processes of creative work. Common to these future scenarios, however, is the notion that the division between schools and the surrounding society are dissolving and that the mediatization of education plays into this process. This state is conceptualised in the analysis with a phrase borrowed from McLuhan (1960), namely as a "classroom without walls".

In this section, I would like to return to the question posed in chapter 7.2.3, of what happens to education in this wall-less space, following Siegert's (2015) argument that walls have taken over the role previously played by doors as "actors in the distribution and circulation of knowledge" (p. 201). As discussed in the beginning of this dissertation, medium theorists such as McLuhan (1960) and Meyrowitz (1986) describe the increased learning taking part outside formal schooling, through mass media, as a threat to the monopoly of knowledge previously held by learning institutions:

> As a result of television, the schoolteacher's control over information is far from absolute, and the school's step-by-step pattern of dispensing information to each age-group is bypassed. Teachers and school administrators can no longer expect children to view them as all-knowing authorities. Not only do-school children now know about some things their teachers never heard of, but like all adults, educators' onstage behaviors have been undermined by the backstage disclosures of television. No matter what the school does, therefore, it can probably never regain the near monopoly over information it once held. (Meyrowitz, 1986, p. 256)

The school described in this quote is dominated by printed books and by a teacher-centred approach, leading Meyrowitz and McLuhan to suggest that the challenges posed by changes in the media environment could be dealt with by means of new pedagogical methods and a conscious implementation of new media forms in the classroom. Today, the situation is dif-

ferent. Contemporary education, at least in the global North, has to a large extent followed these strategies and included audio-visual and interactive media in the design of learning spaces and in national curricula. Research on informal learning processes is conducted within educational research and is increasingly recognized and implemented in compulsory schoolwork, as well as in the professional development and networking of teachers. Indeed, the classroom without walls, as recognized by McLuhan, is seen as a possibility rather than as a threat, and the media world entering the classroom as an already implemented resource. The challenge today is not so much that learning is also taking part outside the classroom and through the media, but that the learning inside the classroom is being reshaped by the interests of media companies. The figurative lack of walls in the contemporary classroom has invited not only alternatives to the textbook, such as film or computer games, but also the introduction of new *logistical media* (Case, 2010; Peters, 2015b, p. 37; Rossiter, 2017) such as learning management systems, data driven technologies for assessment and monitoring and an increased focus on digital competence in educational policy. The digitalization of education has in other words made possible *an infrastructural reshaping of the classroom.*

As recognized within critical studies of educational technology (e.g. Player-Koro, et al., 2018; Selwyn, 2014b; Selwyn & Facer, 2013; Williamson, 2017), this transformation serves the interest of major tech companies that not only get to sell hardware and software on a massive scale, but also to test new technology and educate future users as well as potential future employees. The digitalization of education is, in other words, not mainly a pedagogical project but part of a sociotechnical imaginary where AI and computerization are the solution to all problems, and where the role of education is to train workers for an increasingly computerized labour market. For teachers, this means that they have to work within an infrastructure that is not designed mainly out of their needs or experiences but by other stakeholders, sometimes with a very limited understanding of the everyday work performed in schools. While the teachers in the schools decribed by McLuhan and Meyrowitz could choose single media productions and include them in their teaching, education today is already embedded in various digital systems for communication, assessment and documentation, and while school TV and other educational media texts might open up for critical discussions, the contemporary media infrastructures in schools are kept invisible, based on the logics of user friendliness and efficiency.

The educators in this study have developed different strategies to manage the gap between their own pedagogical beliefs and systems that in their belief reinforce control, standardization and an instrumental approach to learning. By developing new infrastructures, acting like infrastructure in themselves or bypassing control systems by means of a system of double standards, they are able to maintain established pedagogical practices in spite of shortcomings in their work environment. The question that arises is if and how this *infrastructural imagination* (S. J. Jackson et al., 2007) can be used, not only to make up for insufficient media infrastructures and enable good quality teaching, but also to inform the emergence of new infrastructures and pedagogical practices?

To facilitate critical discussion about infrastructures is a more complex matter than, as McLuhan (1960) suggests, helping students to acquire the "skill in analysis of newspapers" or the "ability to discuss a movie intelligently" (p. 3). As discussed throughout this study, infrastructures are characterized by their ubiquity, invisibility and embeddedness in other systems and practices. Educational infrastructures emerge as they are put to use in the everyday work of students and teachers, and to criticise them would by extension also mean a rejection of the educational systems of which they are a part. In combination with being "mundane to the point of boredom" (Star, 1999, p. 377) infrastructures make up a challenging topic to create student engagement around, compared to mass media productions. At the same time, contemporary culture and society where media make up "our infrastructures of being, the habitats and materials through which we act and are" (Peters, 2015b, p. 15) invites precisely this perspective and pushes the need for infrastructure literacy, not least among children and young people.

In the same way as the educators in this study are able to recognize how soft and hard infrastructures condition pedagogical practice, students should be invited to discuss the spatial and virtual configurations of the classroom as well as of other learning environments. Instead of positioning teachers and students as users of technology, an infrastructural perspective on media includes recognizing how media environment emerges in use and how they could be reconfigured to make possible other relations, practices or forms of knowledge. Infrastructural literacy education, when practiced in compulsory schools, should in other ways depart from a critical examination of educational media – both established media such as the classroom and the textbook, and digital successors such as learning management systems or tablet computers – and provide possibilities to try out alternative

configurations. To rephrase the introductory sentence in *City as classroom*: "Let us begin by wondering what you are doing sitting there at your desk" (McLuhan et al., 1977, p. 1), we can begin by asking children what they are doing on their tablets and what would happen if the same material was presented orally by the teacher, in a printed book or through artefacts in a museum. The point, of course, is not to dismiss the use of digital technologies in education but to encourage a critical understanding of how different media and cultural techniques prioritize different ways of thinking and acting and how this is connected to social, political and economic interests.

To critically examine your own everyday environment is difficult. In the tablet example above, the student must consider the difference between touching the screen and flipping the pages in a book, between seeing and listening or between sitting at a desk and moving around in an exhibition space. He or she must further understand the lecture, the book and the exhibition *as* media and take into account the assumptions about education that underpin their pedagogical use. This demands a sensibility to materials and environments that in turn is fundamentally connected to the historicizing perspective and the ability to shift attention from foreground to background that is discussed in this subchapter. Visual arts education combines these three characteristics and could, as argued above, serve not only as a case study to understand the relationship between educators and schools as media environments but also as a place to develop new approaches to teach about and with media.

POSTSCRIPT

Infrastructure literacy in visual arts education – a tentative curriculum

THIS POSTSCRIPT IS DIRECTED at practicing teachers, teacher educators or other professionals interested in media education. It is a proposal on how to implement the findings from this study into pedagogical practice. It largely follows the themes sketched out in the latter part of the concluding discussion and includes media archaeological approaches, visualization exercises, critical perspectives on educational media and a discussion on the dissolving borders between media used inside and outside the classroom. Unlike the other chapters in this dissertation, it should be considered a procedural text with a strong normative stance. Because this subchapter is intended as a working document, references are kept to a minimum. The intellectual debt of this study is instead acknowledged in the other chapters that can be used for further reading.

***

Media literacy education and research have traditionally been directed towards the critical study of mass media content, such as advertising, different kinds of journalistic writing and television. Later contributions to the field have also emphasized the empowering qualities of media and how media technologies can be used as tools for communication and democratic participation. In a parallel process, there is an ongoing digitalization of the educational system taking place, where digital media systems and devices are pushed into schools and new demands on digital competence are included in guidelines and curricula. Despite these policy developments and schools being such media saturated environments, media literacy as a critical perspective tends to be reserved for media outside the school environment and focus on media content, whereas the media used within

schools are regarded as more or less neutral tools that we can use to achieve certain ends.

This dissertation argues, however, that a definition of media as either content or tools is not sufficient to describe the central role of media in contemporary culture and society. Digital media today imbues every aspect of our lived environments, structuring the way we think, act and experience the world. To address the ubiquity and the logistical qualities of media, the framework presented here suggests a turn toward *infrastructures* in media literacy education. An infrastructural perspective on media looks beyond media as messages and explores the systems, manual work and standards that underpin the production and distribution of media texts, making visible the environmental issues and labour involved in providing the world with digital devices. It further addresses the political and economic conditions behind these processes, as well as how new media systems build on old, established technologies. These material, historicizing and critical perspectives offer a supplement to the approach favoured in media literacy contexts, of media as content or tools, used in meaning making processes.

In most school systems, visual arts education includes some aspect of media literacy training, such as interpreting images, understanding media genres and visual rhetoric or using different technologies for media production. By focusing on media content, mass media and popular culture, visual arts education subscribes to the dominant approach to media literacy. Considering the hands-on relation to technologies, material, and environments and the emphasis on creativity and playfulness of this school subject, this does not have to be the case. Instead, this tentative curriculum suggests that visual arts education has the potential to host a range of underexplored perspectives within media literacy education, referred to here as *infrastructure literacy*.

This curriculum is mainly directed to educators in visual arts, teaching between grade 4-12 or in teacher training, to be used as a supplement to the national curriculum. It is divided into three modules starting with 1) a presentation of media archaeology as an artistic and pedagogical method, 2) pedagogical approaches to the relationship between infrastructures and visual culture, and 3) a discussion about visualization as an explorative method, that can also be used to highlight the choices and biases embedded in the construction of data. Each module begins with a background and rationale, followed by suggestions of concrete art projects to be carried out in the classroom, questions to discuss and examples of artist exploring these issues (including some references to texts about these artworks). Most

exercises take the local school setting as starting point to encourage critical reflection on educational technology and on schools as media environments. The projects can be followed in detail or serve as an inspiration for alternative lesson designs. The modules end with a section directed only at the teacher, in order to encourage reflection on the subject and deepen his/her own infrastructure literacy.

Module 1: Media archaeology in the art classroom

Digital tools for image and media production have made it easier to work with media productions such as film, animation and photography in visual arts education. What ten years ago required expensive equipment and rather advanced editing skills can now be made in half the time or less, using a smart phone or a computer tablet. At the same time, few art teachers seem prepared to get rid of old tools for image making and art classrooms tend to become archives of obsolete media technologies. These objects can be repurposed into something else, as is often the case with overhead projectors which have been transformed from visual aids for lecturers to light tables or enlargers. But obsolete media can also be used as a way to understand new technology. Why is it designed in a certain way? What conventions are built into the technology? How does the user friendliness associated with digital tools correspond with the need to alter and adjust the technology in creative processes?

In addition to understanding technology on a more technical level, a historicizing perspective on media can also make us see the future as non-given. This module suggests that a media archaeological approach in visual arts education could help students understand contemporary media technologies, how they have developed and that they could have evolved differently in another kind of culture or society. It aims to give hands-on experience with the precursors to some of our most common media technologies for image making, such as the analogue camera or the film projector, and develop an understanding of the technical underpinnings of present media conventions. It further aims to encourage sustainability in creative processes by exploring recycling as an artistic method.

Exercises

a, Get the students to work in small groups of two or three and choose a spot outside the school that they document using a digital camera or smartphone. Print the photographs. They should then photograph the same spot using a pinhole camera. Detailed instruction on how to make a pinhole camera out of simple materials such as an old tin can or box, aluminium foil, and duct tape can be found online. You will also need photographic paper, developing chemicals and a room that can be darkened (but a fully equipped dark room is not necessary). Keep in in mind that it might take several tries to get a properly exposed image using the pinhole camera and make sure to provide enough lesson time for this. When most groups have managed to get a pinhole photograph of their sites, present the images side by side with the digital prints and discuss:

– In what ways do the images differ?

– How did you approach the site differently using the different cameras?

– Do you think differently about light after trying the pinhole camera?

– Do you think differently about time after trying the pinhole camera?

– How does a camera work?

b, Working with animation is a good way to understand that moving images are just still images shown one by one at a fast pace. However, user friendly applications and software made for stop motion animations often obscure this technology by making the choices *for* you, such as how many images are shown per second. By exploring early animation techniques, the students can develop a better understanding of the relation between the difference in images, the pace at which they are shown and the movement as it appears on the screen. Let the students work in pairs and create a zoetrope. Detailed instructions on how to construct a zoetrope can be found online. This pre animation-device produces the illusion of motion by displaying images with small alterations in a sequence on a spinning cylinder. The images appear smoother than in other early animation techniques such as the flip book, because they are viewed through narrow slits, blurring the images together.

Display the zoetropes in order for everyone to try out each other's finished pieces. Discuss how the size of changes between the images and the spinning pace affect the experience of movement. After this discussion,

explore some common applications for making digital stop motion films. Make sure that the students turn on manual settings and that they have time to try out different combinations. Discuss to what extent manual settings are easier to understand after making the zoetrope, and if they are sufficient to make the kind of movement they strive for in their productions.

Art examples

You have now explored some obsolete technologies for making art. Garnet Hertz and Jussi Parikka (2012) talk about this kind of revitalized technologies as "zombie media" – something being brought back from the dead. In addition, media technologies such as photography or moving images have often been considered as a way of making the past come to life and even resurrecting the dead. Artist Zoe Beloff (www.zoebeloff.com) explores this almost supernatural relationship between the past and discarded media objects in her work *Beyond* where the viewer can move through a virtual landscape of found photographs and early film footage through their own computer, by clicking around on the screen. The project shows the deep relation between how we think about images and the technologies used to create them, as well as how media specific conventions come into being.

Artist Chris Jordan (www.chrisjordan.com) uses discarded technological devices and waste statistics to make visible the environmental consequences of mass consumption and planned obsolescence. In one project, he collaborated with a class of high school students in Melbourne, Australia to create an installation of a giant cell phone out of 7000 discarded phones. By using e-waste as a material, Jordan gives these devices a second life while the scale of the work addresses the urgency of the problem with e-waste and makes visible facts otherwise presented in abstract numbers and statistics.

c, Finish the module by excavating your own art classroom. What obsolete technologies can you find there? Analogue cameras? Tape recorders? Old computers? Animation tables? Present your findings to your students and give them free rein to explore them and produce some kind of visual content. Point out that the technology they choose does not have to be used in the same way as intended, but that they should try to find out what is specific about it, such as light when it comes to photographic technologies and movement when it comes to film and animation. This assignment could be made into a longer project, or function as a start-up task to initiate discussions about technology development. Regardless of how much time the students get to make something out of the classroom findings, make sure you have enough time to discuss their productions in class. Start with questions such as:

– Have you encountered this tool before?

– How did you approach it?

– What tools or technologies are used for the same purpose today?

– Can you think of any symbols, metaphors or conventions that are taken from the older version of the same tool? (Photo editing software is a goldmine for exploring such connections.)

– Is there anything you can do with the old tool that you cannot do with the contemporary kind? Or the opposite – is there anything you can do with contemporary technology that you cannot do with the older tools?

Teacher's reflection

In this module, you have begun to explore your classroom as an archive of dead technologies that might be brought back to life through artistic practice and experimentation. Consider this in relation to current debates about sustainability and e-waste. Is it possible to use old media to understand new technology in other contexts, such as the debate on digital competence? Do we really need to buy cheap electronic components from developing countries to explore the possibilities of new media, or can we understand it by simply looking at older media?

Another topic explored in this module is the conventions associated with specific media, and the way certain technologies are associated with magic. Does this also apply to classroom technologies? Try to make your next presentation using an overhead projector and transparent film, or to make detailed drawings on the white board in advance. What happens when you use visual techniques other than projected power point presentations? Can you use the students' reaction to discuss medium specific qualities in art and image making?

Module 2: Media infrastructures and visual culture

A common approach to media images in visual arts education is semiotics inspired image analysis. Art educators are generally very skilled when it comes to finding implicit assumptions, norms and values in an image, and might use this method to set up lessons where students can reflect upon such topics as racism or sexism in news images, or how stereotypes are used in advertising to sell different products. What might be added to this important area is the question of why images look a certain way: How come

most people in advertising are white? Why is an article about kids and computers illustrated with a typical boy's room? And why are images of office workers over-represented in the job ad section? The answer to these questions can of course be found in societal structures and inequalities when it comes to ethnicity, gender and class but – perhaps more important for visual arts education – these structures are also reinforced by the media systems for storing and distributing images, such as the stock photography industry, classification systems and search engine algorithms. This module explores the intersection of these systems and how they matter for the visual culture around us. The corresponding exercises aim to make the students develop critical and conscious strategies for accessing images online, and to create and publish visual material with proper licensing.

Exercises

a, Ask the students to keep a journal where they document all the images they encounter during one school day. They should pay special attention to material produced by teachers or other employees at the school, such as handouts or power point presentations. Depending on the conditions, students can use their own smartphones and take photographs or make quick drawings in an ordinary notebook. They should also note where the image is from, and on at least two occasions make a mini interview with the teacher or person behind the material and ask where they found the image and why they chose it. In the classroom, compare the journals and the statements and discuss:

– What kind of images did you find (photographs, vector illustrations or something else)?

– How were they used (to show something on its own, as illustrations or as decoration)?

– How did the teachers motivate their choice of image?

– How did they go about finding it?

b, The students are likely to find that many of the images have been accessed via some kind of search engine. Divide the students into pairs and ask them to search for images on a certain term. Choose a term that is common, yet open to interpretation, and that is likely to include people, such as "family", "work" or "student". Ask the students to search the term in English as well as in their native language (if different), to try different search

engines, and to explore images further down the result list to see if they differ from the top ones. They should then take a screen shot of the different results and show this to the rest of the class. Discuss:

– If you did not know this word before, and had to make a guess based on the first twenty images, how would you describe it?

– What are the similarities and differences between the top twenty images?

– Do you recognize this kind of image from somewhere?

– Are the results further down the page different from the top? How?

– Why do you think the images are so similar?

Art examples

Based on these examples you will have a good opportunity to discuss how search and sorting algorithms work and how they might reinforce the dominance of stereotypical images, but also how they can be resisted through creative use. As an example of the latter, Julia Velkova and Anne Kaun (2019) describes the project *World White Web* (www.worldwhiteweb.net) by artist and designer Johanna Burai, where she starts from the experience of searching for images of a hand, ending up with only images of white hands. In response to this, Burai provided a range of photographs of brown hands on the project's webpage, and asked visitors to share, publish and download them in order for the images to get ranked higher by search algorithms. The project was a success and some of the hand images from the project now turning up in the top results if you search for images of hands.

In another project, researcher and digital activist Joy Buolamwini explores how social inequalities are reproduced by machine learning systems such as face recognition algorithms. By using ethnicity biased datasets, computers are mainly trained to recognize white, male faces, whereas black or female faces are often unrecognized or wrongly categorized. To address this problem, Buolamwini founded the *Algorithmic Justice League* (www.ajlunited.org) where she, among other things, features a short documentary art film on the subject, called "The Coded Gaze: Unmasking Algorithmic Bias". This film can be shown in class to initiate discussions on algorithmic bias and how it is related to the people developing algorithms, as well as how this inequality can be addressed and made visible.

c, You will probably also touch upon the generic qualities of the images, and might connect this to the economic model of stock photography. Ask the students to find out all they can about stock photography. This can be performed in the classroom or as a homework. Provide them with questions like:

– When was the stock photography industry established? Why do you think this happened?

– Find out who owns some of the largest stock photo companies. Why does this matter?

– What is microstock photography?

– Search the web for stock image services. Are there any free alternatives?

– How does creative commons licensing work?

d, Ask the students to think about pictures of schools and education and what keywords can be used to search for such images online. They should try to be as specific as possible and imagine different context where images of education can be used. What phrase would you use to find an image about the use of classroom technologies or to illustrate a good teacher? Decide together in class on some topics that you think tend to be illustrated in a stereotypical or one-dimensional way. Each student should now produce at least three images that in some way contribute to a greater diversity of visual representation of the topics you have chosen. Think about:

– Who is usually represented to illustrate this topic? (using categories such as gender, age, ethnicity and body type)

– What are they doing in the image? (Are they active? What mood do they express?)

– What pictorial qualities are used? (using categories such as colour, lightness, composition, camera angle or drawing style)

Then ask the students to try to represent the topic in a different way. They can work with photographic images or digital illustrations. If they work with photography, any models used must give their consent for the images to be published online and all raster images must be of high resolution.

e, Collect the images from each student and put them into an online archive of free stock images of schooling. Organize them together with respect to media type, motif, colour and any other category you can think of. Make sure the students license each image using the creative commons categories. Discuss in class:

– What is the best way to organize the images? On media type, on motif, or something else?

– Can the images be tagged to facilitate searching?

– What platform is suitable for sharing your pictures?

– How do you best describe the project to visitors?

– How can you find out if someone has used your images?

– Can you do something when you yourself search for images to work against uniformity in images?

Teacher's reflection

In this module, your students have been asked to pay attention to the ways in which we access digital images, the economic and technical systems behind these processes and in what way their own search behaviour contributes to maintaining or changing our visual culture. Their first task was to document the use of images by teachers at your school. Try this exercise on your own material and ask yourself how you went about finding the images you use, what function they have and if you could replace them with other images in order to diversify the visual culture present at your workplace.

Also, think about to what extent you discuss search behaviour and copyright with your students. Are they aware of the different databases of creative commons licensed material around? Do you take the time to discuss where and how they have found images that they use in different projects? What other technical and economic systems shape and define the visual culture around us? Can you include a discussion of this in your other art assignments?

Module 3: Data infrastructures and the visualization of knowledge

Module 2 in this curriculum discussed the relationship between digital media infrastructures and visual culture, and how algorithms, data, societal structures and search behaviour coordinate to reproduce more or less diverse representations of things in the world. But data driven technologies are not only used to distribute existing images made by humans, they also create images on their own through visualizations of data. These images also claim to represent the world, even a more objective or distant view of it. This applies not least to schools where data driven technologies such as

educational data mining and learning analytics are increasingly used to monitor, measure and evaluate learning. But what kind of data is used to make these representations of knowledge? How is it collected, processed and presented? And more importantly perhaps, what is excluded from these representations?

Although visual arts education is one of the subjects that might be least affected by learning analytics, art and artistic methods hold the potential to make visible obscured systems and processes, as well as to critically analyse visual representations of abstract data. This module aims to introduce visualization as a method of exploring and creating knowledge around hidden structures and systems, as well as opening up a critical discussion around data visualization and machine generated images.

Exercises

a, Ask your students to make a map of their school as a media environment in groups of three or four. The maps should include both material and social aspects of technology and be based on a physical exploration of the schools, such as walking around, taking notes and photographing. The model of future workshops used in this dissertation can also serve as inspiration. Start with questions such as: Where are computers, tablets or smartboards located? Who has access to them, and in what subjects are they used? How are they moved between different spaces? What happens when a device or software malfunctions? Who is responsible for technical support and maintenance? What purposes other than schoolwork are those devices used for? Where and when are private smart phones allowed? How is this media environment connected to other spaces, both virtual (such as social media platforms) and physical (such as their home environment)?

In class, let two groups explain their maps to each other and compare them. Provide the groups with questions for discussion, such as:

– What aspects are included in the maps? How do they differ between the groups?

– Are social structures perceived differently? Why do you think this is the case?

– Did you discover something unexpected during the making of the maps?

– How are different aspects visualized? Explain to the other groups why you chose certain colours, metaphors or symbols and discuss how they relate to established convention in maps as an image genre.

b, You have now established an understanding of media infrastructures as including both social and technical aspects, and initiated a discussion on how to visualize these different features. Use this as a starting point to introduce the next assignment, where the students work in pairs to explore one social or environmental issue connected to smart phones. The assignment can well be carried out as a comprehensive cross-curricular subject in collaboration with subjects like social or natural sciences (or both). Let the students choose between topics such as: What raw materials are used in the production of cell phones and how are they extracted? In what ways are the extraction and trade around these materials connected to global conflicts and inequalities? What apps collect user data and where does the data end up? What happens to discarded smart phones?

Ask the students to communicate their findings through an artwork. If carried out in collaboration with other subjects, the students can do their research in those lessons and dedicate the art classes to the visualization part. The research part can also be performed as homework. The students can use any material or technique for this assignment, but the visualization should not be in the shape of a poster or other conventional infographic. Present your artworks somewhere in the school building, together with a short text describing each project. Encourage the students to use the room and to engage the visitors, by working, for example, with installation art or interactive elements.

Art examples

One artist devoted to making visible the hidden aspects of media environments is Trevor Paglen (www.paglen.com), who has produced work on underwater cables, satellites and military intelligence systems. In the project *Invisible images,* he explores the data generated images that are used by for example self-driving cars and surveillance technologies, "images made by machines for other machines" as he explains in a conversation with infrastructure scholar Lisa Parks (2019a, p. 141). While these images are intended for other machines to read and normally never exit this closed circuit, they remain invisible to us, but in this project Paglen used a piece of software to render them visible to the human eye. *Invisible images* challenges established definitions of images and visuality and stresses the need to supplement semiotic approaches to media images with infrastructural perspectives.

Another project that addresses how we get to know the world and each other through datasets is called *Dear Data* (www.dear-data.com). Over the course of a year, each week artists Giorgia Lupi and Stefanie Posavec collected some kind of data about their life and turned this into an image that they then sent

> to each other via postal mail. These postcards were then collected and made into a book. The information they gathered about their everyday life and the way it was represented differs from the categories and visualizations we are used to meeting when it comes to data, and included images of how many times during a day they checked the time, said goodbye or what kind of animals they spotted during a week. These rather playful themes show how data categories are everything but objective but created for a certain purpose. It also addresses questions about what is left out of these representations and how they contribute to constructing reality rather than merely representing it.

c, You have now worked with representations of digital tools and systems, but these technologies also create their own visualizations of the data that they gather. Collect and show some data visualizations related to school results, attendance or something else related to education. Try to find some traditional diagrams and some more creative ones. Discuss what kind of data is collected and how it is represented visually. What colours are used, and what kind of shapes or images?

d, Now, ask your students to collect their own educational data for one week. They can choose any aspect that is *not* represented in the visualizations you just discussed but that is still relevant for how they experience education. Suggest topics such as: What was your mood (rated from 1–9) when you came to school this morning? How many minutes did you spend staring at the screen/book/paper before starting on your homework? Which lesson feels shortest or longest?

From this data, the students should make their own, individual data visualizations of schooling. Show different technologies and software you can use for this purpose and encourage experimentation and play. Look at the visualizations together in class and discuss the relation between data visualizations and perceived objectivity, and to what extent this assignment has made the students think differently about the how data is created, sorted and visualized.

Teacher's reflection

In this module, your students have explored visualization, both as a method to create and communicate knowledge, and in relation to the representation of data. Think about the digital systems for assessment and communication that you use in your professional practice. How is knowledge defined and represented in these systems? Does this image correspond with your views

on teaching and what the students should learn? If not, how do you deal with the discrepancy?

Consider the use of commercial software in your classroom, especially free services provided by major tech companies. What do these companies get in exchange when you and your students are using their services? Are there any other options around that do not collect user data? Can you read up on different terms and conditions for different services and use your knowledge to participate in decision making processes at your school?

References

Allen, R. E. S., & Wiles, J. L. (2016). A rose by any other name: participants choosing research pseudonyms. *Qualitative Research in Psychology*, *13*(2), 149–165. https://doi.org/10.1080/14780887.2015.1133746

Amdam, S. (2017). Media Education Goes Professional? *Nordicom Review*, *38*(1), 81–95. https://doi.org/10.1515/nor-2016-0019

Annerberg, A. (2016). *Gymnasielärares skrivpraktiker: skrivande som professionell handling i en digitaliserad skola* [The writing practices of secondary school teachers: professional writing in the digitalized school]. PhD diss. Örebro: Örebro University.

Annus, E. (2012). The Problem of Soviet Colonialism in the Baltics. *Journal of Baltic Studies*, *43*(1), 21–45. https://doi.org/10.1080/01629778.2011.628551

Annus, E. (2016). Between arts and politics: A postcolonial view on Baltic cultures of the Soviet era. *Journal of Baltic Studies*, *47*(1), 1–13. https://doi.org/10.1080/01629778.2015.1103509

Annus, E. (2018). *Soviet postcolonial studies: a view from the western borderlands*. Abingdon; Oxon: Routledge

Aufderheide, P. (1993). *Media Literacy. A Report of the National Leadership Conference on Media Literacy.* Washington DC: Aspen Institute

Autio, O., Soobik, M., & Thorsteinsson, G. (2015). The Development of Craft and Technology Education Curriculums and Students' Attitudes towards Technology in Finland, Estonia and Iceland. *International Journal of Contemporary Educational Research*, *1*(2), 22–34.

Ball, S. (2006). Performativities and fabrications in the education economy: towards the performative society. In H. Lauder, P. Brown, J.-A. Dillabough, & A. H. Halsey (Eds.), *Education, globalization, and social change* (p. 692–701). Oxford; New York: Oxford University Press

Baločkaitė, R. (2011). Pleasures of Late Socialism in Soviet Lithuania: Strategies of Resistance and Dissent. *Journal of Baltic Studies*, *42*(3), 409–425. https://doi.org/10.1080/01629778.2011.597132

Becker, H. S. (1998). *Tricks of the trade: how to think about your research while you're doing it*. Chicago, Ill: University of Chicago Press.

Becker, H. S. (2008). *Art worlds* (25 anniversary ed.). Berkeley: University of California Press.

Behrent, M. C. (2013). Foucault and Technology. *History and Technology*, *29*(1), 54–104. https://doi.org/10.1080/07341512.2013.780351

Bengtsson, S. (2014). Faraway, so close! Proximity and distance in ethnography online. *Media, Culture & Society*, *36*(6), 862–877.

https://doi.org/10.1177/0163443714531195

Bengtsson, S., & Lundgren, L. (2005). *The Don Quixote of youth culture: media use and cultural preferences among students in Estonia and Sweden*. Huddinge: Södertörns högskola.

Benjamin, W. (1996). Experience and Poverty. In *Selected writings* (pp. 731–736). Cambridge, Mass.: Belknap Press of Harvard University Press.

Bertilsson, E. (2015). Lärarutbildning [Teacher education]. In E. Larsson & J. Westberg (Eds.), *Utbildningshistoria: en introduktion* (pp. 189–208). Lund: Studentlitteratur.

Biesta, G. (2010). *Good education in an age of measurement: ethics, politics, democracy*. Boulder, Colo.: Paradigm Publishers.

Bijker, W. E., Hughes, T. P., & Pinch, T. (Eds.). (1987). *The Social construction of technological systems: new directions in the sociology and history of technology*. Cambridge, Mass.: MIT Press.

Björck, C. (2014). *"Klicka där!": En studie om bildundervisning med datorer* ["Click there!": A study about art education with computers]. PhD diss. Stockholm: Stockholm University.

Blomquist, C., & Jacobsson, B. (2002). *Drömmar om framtiden: beslut kring infrastruktur* [Dreams about the future: decisions concerning infrastructures]. Lund: Studentlitteratur.

Blumler, J. G., McLeod, J. M., & Rosengren, K. E. (Eds.). (1992). *Comparatively speaking: Communication and culture across space and time*. Newbury Park, Calif: Sage Publications.

Bodén, L. (2016). *Present absences: Exploring the posthumanist entanglements of school absenteeism*. PhD diss. Linköping: Linköping University.

Bogner, A., Littig, B., & Menz, W. (2009). Introduction: Expert Interviews – An Introduction to a New Methodological Debate. In A. Bogner, B. Littig, & W. Menz (Eds.), *Interviewing Experts* (pp. 1–13). New York: Palgrave Macmillan.

Bogner, A., & Menz, W. (2009). The Theory-Generating Expert Interview: Epistemological Interest, Forms of Knowledge, Interaction. In A. Bogner, B. Littig, & W. Menz (Eds.), *Interviewing Experts* (pp. 43–80). New York: Palgrave Macmillan.

Bohlin, P. (2017). En inkluderande bildundervisning [Inclusive visual arts education]. In G. Åsén (Ed.), *Bildundervisning och lärande genom bilder* (pp. 28–57). Stockholm: Liber.

Bolin, G. (2006). Electronic Geographies. Media Landscapes as Technological and Symbolic Environments. In J. Falkheimer & A. Jansson (Eds.), *Geographies of communication: the spatial turn in media studies* (pp. 67–86). Göteborg: Nordicom.

Bolin, G. (2012). Introduction: Cultural Technologies in Cultures of Technology. In G. Bolin (Ed.), *Cultural technologies: the shaping of culture in media and society* (pp. 1–15). London; New York: Routledge.

Bolin, G. (2016). *Media generations: experience, identity and mediatised social change*. London; New York: Routledge.

Bolter, J. D., & Grusin, R. (1999). *Remediation: understanding new media*. Cambridge, Mass.: MIT Press.

Bowker, G. C., Baker, K., Millerand, F., & Ribes, D. (2009). Toward Information Infrastructure Studies: Ways of Knowing in a Networked Environment. In J. Hunsinger, L. Klastrup, & M. Allen (Eds.), *International Handbook of Internet Research* (pp. 97–117). https://doi.org/10.1007/978-1-4020-9789-8_5

Bowker, G. C., & Star, S. L. (1999). *Sorting things out: classification and its consequences*. Cambridge, Mass.: MIT Press.

Bowker, G. C., & Star, S. L. (2002). How to Infrastructure. In L. A. Lievrouw & S. M. Livingstone (Eds.), *Handbook of new media: social shaping and consequences of ICTs* (pp. 151–162). London; Thousand Oaks, Calif.: SAGE.

Braman, S. (2012). Technology and Epistemology: Information Policy and Desire. In G. Bolin (Ed.), *Cultural technologies: the shaping of culture in media and society* (pp. 133–150). London; New York: Routledge.

Breiter, A. (2014). Schools as Mediatized Worlds from a Cross-cultural Perspective. In A. Hepp & F. Krotz (Eds.), *Mediatized worlds: culture and society in a media age*. Basingstoke: Palgrave Macmillan.

Breiter, A., & Ruhe, A. H. (2018). Paper Versus School Information Management Systems: Governing the Figurations of Mediatized Schools in England and Germany. In *Transforming Communications – Studies in Cross-Media Research. Communicative Figurations* (pp. 313–339). https://doi.org/10.1007/978-3-319-65584-0_13

Buckingham, D. (2003). *Media education: literacy, learning and contemporary culture*. Malden, Mass.: Polity.

Buhl, M. (2005). Visual culture as a strategic approach to art production in education. *International Journal of Education through Art*, *1*(2), 103–114. https://doi.org/10.1386/etar.1.2.103/1

Burman, A. (2014). *Att växa som människa: om bildningens traditioner och praktiker* [To grow as a human being: on the traditions and practices of Bildung]. Huddinge: Södertörns högskola.

Calinescu, M. (1979). Hermeneutics or Poetics. *The Journal of Religion*, *59*(1), 1–17. https://doi.org/10.1086/486662

Carse, A. (2012). Nature as infrastructure: Making and managing the Panama Canal watershed. *Social Studies of Science*, *42*(4), 539–563. https://doi.org/10.1177/0306312712440166

Case, J. (2010). *Geometry of empire: radar as logistical medium*. Unpublished PhD diss., University of Iowa, Iowa Coty.

Chabe, A. M. (1969). Soviet curricular developments and trends. *Educational Leadership*, *26*(7), 666–670.

Chan, A. S. (2019). Venture Ed. Recycling Hype, Fixing Futures, and the Temporal Order of Edtech. In J. Vertesi & D. Ribes (Eds.), *digitalSTS: A Field Guide for Science et Technology Studies*. https://doi.org/10.1515/9780691190600

Charles, A. (2009). The Electronic State: Estonia's New Media Revolution. *Journal of Contemporary European Research*, *5*(1), 97–113.

Christensen, O., & Tufte, B. (2010). Media Education – Between Theory and Practice. In S. Kotilainen & S.-B. Arnolds-Granlund (Eds.), *Media literacy education: Nordic perspectives* (pp. 109–120). Göteborg: Nordicom, in cooperation with the Finnish Society on Media Education.

Chung, S. K., & Kirby, M. S. (2009). Media Literacy Art Education: Logos, Culture Jamming, and Activism. *Art Education*, *62*(1), 34–39. https://doi.org/10.1080/00043125.2009.11519002

Corden, A., & Sainsbury, R. (2006). Exploring 'Quality': Research Participants' Perspectives on Verbatim Quotations. *International Journal of Social Research Methodology*, *9*(2), 97–110. https://doi.org/10.1080/13645570600595264

Couldry, N. (2008). Actor network theory and media: do they connect and on what terms? In A. Hepp, F. Krotz, S. Moores, & C. Winter (Eds.), *Connectivity, networks and flows: conceptualizing contemporary communications* (pp. 93–110). Cresskill, NJ: Hampton Press, Inc.

Couldry, N., & Hepp, A. (2017). *The mediated construction of reality*. Cambridge, UK: Polity Press.

Cuban, L. (1986). *Teachers and machines: the classroom use of technology since 1920*. New York: Teachers college press.

Cuban, L., & Jandrić, P. (2015). The dubious promise of educational technologies: Historical patterns and future challenges. *E-Learning and Digital Media*, *12*(3–4), 425–439. https://doi.org/10.1177/2042753015579978

Danielsson, H. (2002). *Att lära med media: om det språkliga skapandets villkor i skolan med fokus på video* [Learning with media: linguistic creativity in school, focused on video]. PhD diss. Stockholm: Stockholm University.

De Witt, N. (1961). *Education and professional employment in the U.S.S.R.* Washington: The Found: United States Government printing office distr.

Deuze, M. (2011). Media life. *Media, Culture & Society*, *33*(1), 137–148. https://doi.org/10.1177/0163443710386518

Dirckinck-Holmfeld, L., Ipsen, B. J., Tamborg, A. L., Dreyøe, J., Allsopp, B. B., & Misfeldt, M. (2019). Modes of Teacher Participation in the Digitalization of School. *Designs for Learning*, *11*(1), 63–71. https://doi.org/10.16993/dfl.109

diSessa, A. (2000). *Changing minds: computers, learning, and literacy*. Cambridge, Mass.: MIT Press.

Dowd, J. (2018). Education and everyday life: McLuhan's 'city as classroom' as a practice of social justice in social change. *Journal of Multicultural Discourses*, 1–15. https://doi.org/10.1080/17447143.2018.1439947

Downey, G. J. (2014). Making Media work: Time, Space, Identity, and Labor in the analysis of Information and Communication Structures. In T. Gillespie, P. J. Boczkowski, & K. A. Foot (Eds.), *Media technologies: essays on communication, materiality, and society* (pp. 141–165). Cambridge, Mass.: MIT Press.

Drotner, K. (1996). *At skabe sig – selv: ungdom, æstetik, pædagogik* [To create one – self: youth, aesthetics, pedagogy]. Copenhagen: Gyldendal.

Drotner, K. (2008). Leisure is hard work: digital practices and future competences. *Youth, Identity, and Digital Media*, 187–211.

Duncan, C. (1995). *Civilizing rituals: inside public art museums*. London: Routledge.

Duncum, P. (2001). Visual Culture: Developments, Definitions, and Directions for Art Education. *Studies in Art Education*, *42*(2), 101–112. https://doi.org/10.1080/00393541.2001.11651691

Eckeskog, L. (2019). *Kommunikation i förskolan: förskollärares och barnskötares kommunikation med föräldrar i ett digitaliserat medielandskap* [Communication in pre-school: pre-school teachers and childcare workers communicating with parents in a digitalised media landscape]. PhD diss. Umeå: Umeå University.

Edgren, H. (2015). Folkskolan och grundskolan [Elementary school and compulsory school]. In E. Larsson & J. Westberg (Eds.), *Utbildningshistoria: en introduktion* (2. ed., pp. 113–130). Lund: Studentlitteratur.

Edling, M. (2010). *Fri konst?: bildkonstnärlig utbildning vid Konsthögskolan Valand, Konstfackskolan och Kungl. Konsthögskolan 1960-1995* [Free art?: higher art education at Valand art academy, Konstfack university college and Royal academy of arts 1960-1995]. Göteborg: Makadam.

Edwards, P. N. (2003). Infrastructure and Modernity: Force, Time and Social Organization in the History of Sociotechnical Systems. In T. J. Misa, P. Brey, & A. Feenberg (Eds.), *Modernity and technology* (pp. 185–225). Cambridge, Mass.: MIT Press.

Edwards, P. N., Jackson, S. J., Chalmers, M. K., Bowker, G. C., Borgman, C. L., Ribes, D., Burton, M. & Calvert, S. (2013). *Knowledge infrastructures: Intellectual frameworks and research challenges*. Ann Arbor: Deep Blue.

Eisenstein, E. L. (1985). *The printing press as an agent of change: communications and cultural transformations in early-modern Europe.* Cambridge, UK: Cambridge University Press.

Ekberg, N. (2012). *Lärares möten med sociala medier: applikationer i behov av explikationer* [Teachers' encounters with social media: applications in need of explications]. PhD diss. Luleå: Luleå Technical University.

Eklund, S. (2002). *Från teckning till pedagogiskt arbete i bild: Umeåutbildningen till lärare i bild 25 år* [From drawing to visual arts education: 25 years of art teacher training in Umeå]. Umeå: Fakultetsnämnden för lärarutbildning, Umeå universitet.

Ericson, S. (Ed.). (2002). *Hello Europe! Tallinn calling!: Eurovision Song Contest 2002 som mediehändelse* [Hello Europe! Tallinn calling!: Eurovision Song Contest 2002 as a media event]. Huddinge: Medie- och kommunikationsvetenskap, Södertörns högskola.

Ericson, S. (2019). The Lecture Room (1962) – on dark rooms, antennas, and the synchronization of education. In P. Jakobsson & F. Stiernstedt (Eds.), *Fritt från fältet Om medier, generationer och värden. Festskrift till Göran Bolin* (pp. 219–231). Huddinge: Södertörns högskola.

Ericson, S., & Riegert, K. (2010). *Media houses: architecture, media and the production of centrality*. New York: Peter Lang.

Erixon, P.-O. (2014). *Skolämnen i digital förändring: en medieekologisk undersökning* [School subjects in transformation: a media ecological study]. Lund: Studentlitteratur.

Errázuriz, L. (2019). Metamorphosis of visual literacy: From "reading images" to a critical visual education. *International Journal of Education Through Art*, *15*(1), 15–26. https://doi.org/10.1386/eta.15.1.15_1

Erss, M., Kalmus, V., & Autio, T. H. (2016). 'Walking a fine line': teachers' perception of curricular autonomy in Estonia, Finland and Germany. *Journal of Curriculum Studies*, *48*(5), 589–609. https://doi.org/10.1080/00220272.2016.1167960

Erstad, O. (2010). Media Literacy and Education. The Past, Present and Future. In S. Kotilainen & S.-B. Arnolds-Granlund (Eds.), *Media literacy education: Nordic perspectives* (pp. 15–27). Göteborg: Nordicom, in cooperation with the Finnish Society on Media Education.

Erstad, O. (2013). *Digital learning lives: trajectories, literacies, and schooling*. New York: Peter Lang.

Erstad, O., & Sefton-Green, J. (2013). Digital disconnect? The "digital learner" and the school. In O. Erstad & J. Sefton-Green (Eds.), *Identity, community, and learning lives in the digital age* (pp. 87–104). New York, NY: Cambridge University Press.

Feilitzen, C. von, & Carlsson, U. (Eds.). (2004). *Promote or protect? Perspectives on media literacy and media regulations*. Göteborg: Nordicom.

Felski, R. (2016). Comparison and Translation: A Perspective from Actor-Network Theory. *Comparative Literature Studies*, *53*(4), 747–765.

Felt, U. (2015). Keeping Technology Out: Sociotechnical Imaginaries and the Formation of Austria's Technopolitical Identity. In S. Jasanoff & S.-H. Kim (Eds.), *Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power* (pp. 103–125). Chicago: The University of Chicago Press.

Ferneding, K. (2003). *Questioning Technology: Electronic Technologies and Educational Reform*. New York: Peter Lang Inc., International Academic Publishers.

Fersch, B. (2013). Meaning: lost, found or "made" in translation? A hermeneutical approach to cross-language interview research. *Qualitative Studies*, *4*(2), 86–99. https://doi.org/10.7146/qs.v4i2.8859

Fornäs, J. (2017). *Defending Culture: Conceptual Foundations and Contemporary Debate*. Cham: Springer International Publishing.

Fors, V., & Bäckström, Å. (2015). *Visuella metoder* [Visual methods]. Lund: Studentlitteratur.

Forsler, I. (2018a). Researching infrastructural imaginaries in education through future workshops. *SAGE Research Methods Cases*. SAGE Method Space. doi: 10.4135/9781526442116

Forsler, I. (2018b). Towards infrastructure literacy in media education. *The Journal of Media Literacy*, *65*(1 & 2), 87–91.

Forsman, M. (2018). Digital competence and the future media citizen. A preliminary conceptual analysis. *The Journal of Media Literacy*, *65*(1 & 2), 24–28.

Forsman, M. (2019). Framtiden är redan här: om plattformifieringen av skolan och fostran av framtidens mediemedborgare [The future is already here: on the platformization of schools and the education of the future media citizen]. In J. Andersson Schwarz & S. Larsson (Eds.), *Plattformssamhället: den digitala utvecklingens politik, innovation och reglering* (pp. 200–229). Stockholm: Fores.

Fram, S., & Margolis, E. (2011). Architectural and built environment discourses in an educational context: the Gottscho and Schleisner Collection. *Visual Studies*, *26*(3), 229–243. https://doi.org/10.1080/1472586X.2011.610946

franzke, a. s., Bechmann, A., Zimmer, M., Ess, C. M., & Association of Internet Researchers. (2020). *Internet Research: Ethical Guidelines 3.0*. Retrieved January 10, 2020 from the AoIR website: https://aoir.org/reports/ethics3.pdf

Freedman, K., & Stuhr, P. (2004). Curriculum Change for the 21st Century: Visual Culture in Art Education. In E. W. Eisner & M. D. Day (Eds.), *Handbook of research and policy in art education* (pp. 815–828). Mahwah, N.J.: National Art Education Association.

Friesen, N., & Cressman, D. (2010). Media Theory, Education and the University: A Response to Kittler's History of the University as a Media System. *Canadian Journal of Media Studies*, *7*(1).

Friesen, N., & Hug, T. (2009). The Mediatic Turn: Exploring Consequences for Media Pedagogy. In K. Lundby (Ed.), *Mediatization: concept, changes, consequences*. New York: Lang.

Friesen, N., & Hug, T. (2011). After the Mediatic Turn: McLuhan's Training of the Senses and Media Pedagogy today. In *Medialität und Realität* (pp. 83–101). https://doi.org/10.1007/978-3-531-92896-8_6

Fritze, Y., Haugsbakk, G., & Nordkvelle, Y. (2016). Visual 'Bildung' between iconoclasm and idolatry. *Nordicom Review*, *37*(2), 17–31. https://doi.org/10.1515/nor-2016-0015

Frost, U. (1988). *Förlagor och teckningsläror: ett bidrag till den svenska teckningsundervisningens historia särskilt avseende 1800-talet* [Templates and drawing lessons: a contribution to the history of Swedish drawing education, focused on the 19th century]. PhD diss. Stockholm: Stockholm University.

Fujimura, J. H. (1987). Constructing 'Do-able' Problems in Cancer Research: Articulating Alignment. *Social Studies of Science*, *17*(2), 257–293. https://doi.org/10.1177/030631287017002003

Fulková, M. (2019). Observations about the Common European Framework of Reference for Visual Literacy. *International Journal of Education Through Art*, *15*(1), 75–83. https://doi.org/10.1386/eta.15.1.75_1

Gapski, H., Staufer, W. R. W., & Oberle, M. (Eds.). (2017). *Medienkompetenz: Herausforderung für Politik, politische Bildung und Medienbildung* [Media competence: Challenges for politics, political education and media education]. Bonn: Bundeszentrale für politische Bildung.

Gauntlett, D. (2007). *Creative explorations: new approaches to identities and audiences*. London; New York: Routledge.

Gauntlett, D., & Holzwarth, P. (2006). Creative and visual methods for exploring identities. *Visual Studies*, *21*(1), 82–91. https://doi.org/10.1080/14725860600613261

Gentikow, B. (2007). The role of media in developing literacies and cultural techniques. *Nordic Journal of Digital Literacy*, *2*(02), 78–96.

Geoghegan, B. D. (2013). After Kittler: On the Cultural Techniques of Recent German Media Theory. *Theory, Culture & Society*, *30*(6), 66–82. https://doi.org/10.1177/0263276413488962

Gerasimova, E., & Chuikina, S. (2009). The Repair Society. *Russian Studies in History*, *48*(1), 58–74. https://doi.org/10.2753/RSH1061-1983480104

Gitelman, L. (2006). *Always already new: media, history and the data of culture*. Cambridge, Mass.: MIT Press.

Goddard, M. (2015). Opening up the black boxes: Media archaeology, 'anarchaeology' and media materiality. *New Media & Society*, *17*(11), 1761–1776. https://doi.org/10.1177/1461444814532193

Godhe, A.-L. (2019). Digital Literacies or Digital Competence: Conceptualizations in Nordic Curricula. *Media and Communication*, *7*(2), 25–35. https://doi.org/10.17645/mac.v7i2.1888

Golomštok, I. N. (1985). The History and Organization of Artistic Life in the Soviet Union. In M. Rueschemeyer, J. Kennedy, & I. N. Golomštok (Eds.), *Soviet emigré artists: life and work in the USSR and the United States*. Armonk: Sharpe.

Good, K. D. (2019). Sight-Seeing in School: Visual Technology, Virtual Experience, and World Citizenship in American Education, 1900–1930. *Technology and Culture*, *60*(1), 98–131. https://doi.org/10.1353/tech.2019.0003

Good, K. D. (2020). *Bring the world to the child: technologies of global citizenship in american education*. Cambridge, Mass.: MIT Press.

Gray, J., Gerlitz, C., & Bounegru, L. (2018). Data infrastructure literacy. *Big Data & Society*, *5*(2), 2053951718786316. https://doi.org/10.1177/2053951718786316

Grönlund, Å. (2014). *Att förändra skolan med teknik: Bortom en dator per elev* [Changing the school with technology: Beyond one laptop per child]. Örebro: Örebro universitet.

Guillemin, M., & Drew, S. (2010). Questions of process in participant-generated visual methodologies. *Visual Studies*, *25*(2), 175–188. https://doi.org/10.1080/1472586X.2010.502676

Hall, S., & Whannel, P. (1964). *The popular arts*. London: Hutchinson.

Hammersley, M., & Atkinson, P. (2007). *Ethnography: principles in practice* (3rd ed). Milton Park; Abingdon; Oxon: Routledge.

Haraway, D. (1997). *Modest_Witness@Second_Millennium.FemaleMan©_ Meets_OncoMouse: feminism and technoscience*. New York: Routledge.

Hartong, S. (2016). Between Assessments, Digital Technologies and Big Data: The Growing Influence of "Hidden" Data Mediators in Education. *European Educational Research Journal*, *15*(5), 523–536. https://doi.org/10.1177/1474904116648966

Hartong, S., & Förschler, A. (2019). Opening the black box of data-based school monitoring: Data infrastructures, flows and practices in state education agencies. *Big Data & Society*, *6*(1), 2053951719853311. https://doi.org/10.1177/2053951719853311

Heidegger, M. (1977). *The question concerning technology, and other essays* (1st ed.). New York: Harper & Row.

Heise, U. K. (2002). Unnatural Ecologies: The Metaphor of the Environment in Media Theory. *Configurations*, *10*(1), 149–168.

Hellman, A. (2017). *Visuella möjlighetsrum. Gymnasieelevers subjektsskapande i bild och medieundervisning* [Visual spaces of possibility – upper secondary school pupils' subjectivation and becoming in visual art and media education]. PhD diss. Gothenburg: University of Gothenburg.

Helme, S. (2002). Nationalism and Dissent: Art and Politics in Estonia, Latvia and Lithuania under the Soviets. In A. Rosenfeld, N. T. Dodge, & Jane Voorhees Zimmerli Art Museum (Eds.), *Art of the Baltics: the struggle for freedom of artistic expression under the Soviets, 1945-1991: [Estonia, Latvia, Lithuania]* (pp. 6–16). New Brunswick, NJ: Rutgers University Press.

Hepp, A., & Couldry, N. (2009). What should comparative media research be comparing? towards a transcultural approach to 'media cultures'. In D.K. Thussu (Ed.), *Internationalizing Media Studies* (pp. 32–48). Abingdon: Routledge

Hermes, J. (2012). The Scary Promise of Technology: Developing New Forms of Audience Research. In G. Bolin (Ed.), *Cultural technologies: the shaping of culture in media and society* (pp. 189–201). London; New York: Routledge.

Hertz, G., & Parikka, J. (2012). Zombie Media: Circuit Bending Media Archaeology into an Art Method. *Leonardo*, *45*(5), 424–430. https://doi.org/10.1162/LEON_a_00438

Hickey-Moody, A. (2013). *Youth, arts and education: reassembling subjectivity through affect*. New York: Routledge.

Hobbs, R. (1998). The seven great debates in the media literacy movement. *Journal of Communication*, *48*(1), 16–32. https://doi.org/10.1111/j.1460-2466.1998.tb02734.x

Holmlund, H., Häggblom, J., Lindahl, E., Martinson, S., Sjögren, A., Vikman, U., & Öckert, B. (2014). *Decentralisering, skolval och fristående skolor: resultat och likvärdighet i svensk skola* [Decentralization, school choice and independent schools: results and equality in Swedish education]. Uppsala: Institutet för arbetsmarknads- och utbildningspolitisk utvärdering (IFAU).

Hug, T. (2011). Visual Competence, Media Literacy and "New Literacies" – Conceptual Considerations in a Plural Discursive Landscape. *Seminar.Net*, *7*(1).

Hylén, J. (2011). *Digitaliseringen av skolan* [The digitalization of schools] (2nd ed). Lund: Studentlitteratur.

Håkansson Lindqvist, M. (2015). *Conditions for technology enhanced learning and educational change: a case study of a 1:1 initiative*. PhD diss. Umeå: Umeå University.

Ilomäki, L., Kantosalo, A., & Lakkala, M. (2011). What is digital competence? In *Linked Portal* (pp. 1-12). Brussels: European Schoolnet (EUN).

Ingold, T. (2002). *The perception of the environment: Essays on livelihood, dwelling and skill*. London; New York: Routledge.

Innis, H. A. (1950). *Empire and communications*. Oxford: Clarendon Press.

Innis, H. A. (1951). *The bias of communication*. Toronto: University of Toronto Press.

Jackson, P. W. (1990). *Life in classrooms*. New York: Teachers College Press.

Jackson, S. J. (2014). Rethinking Repair. In T. Gillespie, P. J. Boczkowski, & K. A. Foot (Eds.), *Media technologies: essays on communication, materiality, and society* (pp. 221–239). Cambridge, Mass.: MIT Press.

Jackson, S. J., Edwards, P. N., Bowker, G. C., & Knobel, C. P. (2007). Understanding infrastructure: History, heuristics and cyberinfrastructure policy. *First Monday*, *12*(6).

Jakku-Sihvonen, R., Tissari, V., Ots, A., & Uusiautti, S. (2012). Teacher Education Curricula after the Bologna Process – a Comparative Analysis of Written Curricula in Finland and Estonia. *Scandinavian Journal of Educational Research*, *56*(3), 261–275. https://doi.org/10.1080/00313831.2011.581687

Jasanoff, S. (2015a). Future imperfect: Science, technology, and the imaginations of modernity. In S. Jasanoff & S.-H. Kim (Eds.), *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power* (pp. 1–47). Chicago: The University of Chicago Press.

Jasanoff, S. (2015b). Imagined and Invented Worlds. In S. Jasanoff & S.-H. Kim (Eds.), *Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power* (pp. 321–341). Chicago: The University of Chicago Press.

Jasanoff, S., & Kim, S.-H. (2015). *Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power*. Chicago: The University of Chicago Press.

Jenkins, H. (2008). *Convergence culture: where old and new media collide*. New York: University Press.

Jensen, K. B. (2013). *A Handbook of Media and Communication Research Qualitative and Quantitative Methodologies.* (1st ed.). Hoboken: Taylor and Francis.

Johannesen, M., Erstad, O., & Habib, L. (2012). Virtual learning environments as sociomaterial agents in the network of teaching practice. *Computers & Education*, *59*(2), 785–792. https://doi.org/10.1016/j.compedu.2012.03.023

Jones, A., & Bissell, C. (2011). The social construction of educational technology through the use of authentic software tools. *Research in Learning Technology*, *19*(3), 285–297. https://doi.org/10.1080/21567069.2011.624995

Jonsson Widén, A. (2016). *Bildundervisning i möte med samtidskonst: bildlärares professionella utveckling i olika skolformer* [Applying contemporary art in visual art education: teachers' professional development in different school contexts]. PhD diss. Umeå: Umeå University.

Jungk, R., & Mullert, N. (1987). *Future workshops: how to create desirable futures*. London: Institute for Social Inventions.

Kannengießer, S. (2020). Engaging with and reflecting on the materiality of digital media technologies: Repair and fair production. *New Media & Society*, *22*(1), 123–139. https://doi.org/10.1177/1461444819858081

Karaseva, A., Pruulmann-Vengerfeldt, P., & Siibak, A. (2013). Comparison of different subject cultures and pedagogical use of ICTs in Estonian schools. *Nordic Journal of Digital Literacy* (3), 157–171.

Karasti, H., Pipek, V., & Bowker, G. (2018). An Afterword to 'Infrastructuring and Collaborative Design.' *Computer Supported Cooperative Work (CSCW)*, *27*(2), 267–289. https://doi.org/10.1007/s10606-017-9305-x

Karasti, H., & Syrjänen, A.-L. (2004). Artful infrastructuring in two cases of community PD. *Proceedings of the Eighth Conference on Participatory Design Artful Integration: Interweaving Media, Materials and Practices – PDC 04*, *1*, 20. https://doi.org/10.1145/1011870.1011874

Karlsohn, T. (2009). *Teknik – retorik – kritik: om IT-bubblan och datoriseringen av den svenska skolan* [Technology – rhetoric – critique: on the dotcom bubble and the computerization of Swedish schools]. Stockholm: Carlsson.

Kárpáti, A., & Gaul, E. (Eds.). (2013). *From child art to visual language of youth: new models and tools for assessment of learning and creation in art education*. Bristol: Intellect.

Katz, E. (1987). Communications Research since Lazarsfeld. *Public Opinion Quarterly*, *51*(4 part 2), 525-545. https://doi.org/10.1093/poq/51.4_PART_2.S25

Kaun, A. (2012). *Civic experiences and public connection: media and young people in Estonia*. PhD diss. Örebro: Örebro University.

Kellner, D., & Share, J. (2007). Critical media literacy is not an option. *Learning Inquiry*, *1*(1), 59–69. https://doi.org/10.1007/s11519-007-0004-2

Kensing, F., & Madsen, K. H. (1992). Generating visions: future workshops and metaphorical design. In J. Greenbaum & M. Kyng (Eds.), *Design at work: cooperative design of computer systems* (pp. 155–168). Hillsdale: L. Erlbaum Associates Inc.

Kerr, S. T., & Meyrowitz, J. (Eds.). (1996). Taking McLuhan and "Medium Theory" Seriously: Technological Change and the Evolution of Education. In *Technology and the future of schooling* (1. print, pp. 73–110). Chicago, Ill: University of Chicago Press.

Khavenson, T., & Carnoy, M. (2016). The Unintended and Intended Academic Consequences of Educational Reforms: The Cases of Post-Soviet Estonia, Latvia and Russia. *Oxford Review of Education*, *42*(2), 178–199. https://doi.org/10.1080/03054985.2016.1157063

King, A. (1993). From sage on the stage to guide on the side. *College Teaching*, *41*(1), 30–35.

King, B. (1948). *Russia goes to school: a guide to Soviet education*. London: New Education Book Club (NEBC)

Kirkeby, I. M. (2006). *Skolen finder sted* [School takes place]. PhD diss., KTH Royal Institute of Technology. Hørsholm: Statens Byggeforskningsinstitut.

Kittler, F. (1990). *Discourse networks 1800/1900*. Stanford, Calif.: Stanford University Press.

Kittler, F. (2004). Universities: Wet, Hard, Soft, and Harder. *Critical Inquiry*, *31*(1), 244–255. https://doi.org/10.1086/427310

Klebl, M. (2008). Explicating the shaping of educational technology: Social construction of technology in the field of ICT in education. *Readings in Education and Technology: Proceedings of ICICTE 2008*, 278-289.

Knoblauch, H. (2005). Focused Ethnography. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *6*(3). https://doi.org/10.17169/fqs-6.3.20

Kockum, A. (2019). Bilden blir språk och kunskapen om miljön vaknar [The image as language and the awakening of environmental knowledge]. In A. Kockum, B. Alling-Ode, & U. Lind (Eds.), *Återkomsten: bilden, skolan och samhället 1968-2018* (pp. 127–142). Göteborg: Rojal förlag.

Kockum, A., Alling-Ode, B., & Lind, U. (2019). *Återkomsten: bilden, skolan och samhället 1968-2018*. Göteborg: Rojal förlag.

Krauss, R. (2000). *"A voyage on the North Sea": art in the age of the post-medium condition*. London: Thames & Hudson.

Krauss, R. (2010). *Perpetual inventory*. Cambridge, Mass.: MIT Press.

Krull, E. (2007). Promoting teacher education curricula by using methods of historical research: Estonian case. *Trames: A Journal of the Humanities and Social Sciences, 11*(1), 69–85.

Krull, E., & Mikser, R. (2010). Reflection of Cross-Curricular Ideas in the Estonian Curricula of General Education: An Historical Study. *Trames: A Journal of the Humanities and Social Sciences, 14*(1), 34–53.

Krull, E., & Trasberg, K. (2006). Changes in Estonian General Education from the Collapse of the Soviet Union to EU Entry. *ERIC Online Submission*, 1–19.

Krämer, S., & Bredekamp, H. (2013). Culture, Technology, Cultural Techniques – Moving Beyond Text. *Theory, Culture & Society*, *30*(6), 20–29. https://doi.org/10.1177/0263276413496287

Kuskis, A. (2015). The media literacy movement's debt to Marshall McLuhan. *Explorations in Media Ecology*, *14*(3), 305–316. https://doi.org/10.1386/eme.14.3-4.305_1

Kvale, S. (2007). *Den kvalitativa forskningsintervjun* [Qualitiative research interviews]. Lund: Studentlitteratur.

Kärner, E. (2002). *Multi-Culture and Popular Culture in Estonian Art Education*. Paper presented at the InSea World Congress 2002, New York, US.

Kärner, E. (2006). *Art education in Estonia: a historic survey and modern time*. Paper presented at the InSea World Congress 2006, Viseu, Portugal.

Lagerspetz, M. (2003). How Many Nordic Countries?: Possibilities and Limits of Geopolitical Identity Construction. *Cooperation and Conflict*, *38*(1), 49–61. https://doi.org/10.1177/0010836703038001003

Lapinskė, L. (2020). *Care to live: precarious livelihoods and everyday survival strategies of single mothers in Lithuania*. Unpublished PhD diss., Södertörn University, Huddinge.

Larkin, B. (2013). The Politics and Poetics of Infrastructure. *Annual Review of Anthropology*, *42*(1), 327–343. https://doi.org/10.1146/annurev-anthro-092412-155522

Latour, B. (1986). Visualisation and Cognition: Thinking with Eyes and Hands. *Knowledge and Society – Studies in the Sociology of Culture Past and Present, Vol 6.*, *6*, 1–40.

Latour, B. (1987). *Science in action: how to follow scientists and engineers through society*. Cambridge, Mass.: Harvard University Press.

Latour, B. (1998). How to be Iconophilic in Art, Science and Religion. In C. A. Jones & P. Galison (Eds.), *Picturing science, producing art* (pp. 418–440). New York: Routledge.

Latour, B. (2005). *Reassembling the social: an introduction to actor-network-theory*. Oxford: Oxford University Press.

Lauristin, M. (1997). Contexts of Transition. In L. Weibull, K. E. Rosengren, S. Holmberg, P. Vihalemm, & M. Lauristin (Eds.), *Return to the Western world: cultural and political perspectives on the Estonian post-communist transition* (pp. 25–40). Tartu: Tartu University Press.

Lauristin, M. (2003). Social Contradictions Shadowing Estonia's "Success Story." *Demokratizatsiya: The Journal of Post-Soviet Democratization*, *11*(4), 601–616.

Lawn, M., & Grosvenor, I. (2005). *Materialities of schooling: design, technology, objects, routines*. Oxford: Symposium Books.

Lieshout, M. van, Egyedi, T. M., & Bijker, W. E. (Eds.). (2001). *Social learning technologies: the introduction of multimedia in education*. Aldershot: Ashgate.

Lind, U. (2010). *Blickens ordning: bildspråk och estetiska lärprocesser som kulturform och kunskapsform* [The order of seeing: visual languages and aesthetic learning processes as forms of culture and knowledge]. PhD diss. Stockholm: Stockholm University.

Lind, U., & Hasselberg, K. (2019). Bilden, skolan och samhället – i lärarutbildning och med elevens blick [Visual arts education, school and society – in teacher training and through the eyes of the pupil]. In A. Kockum, B. Alling-Ode, & U. Lind (Eds.), *Återkomsten: bilden, skolan och samhället 1968-2018* (pp. 199–229). Göteborg: Rojal förlag.

Lindensjö, B., & Lundgren, U. P. (2014). *Utbildningsreformer och politisk styrning* [Educational reforms and political control]. Stockholm: Liber.

Lindgren, A.-L. (1996). *"Att ha barn med är en god sak": skolradion och kampen om barn i svensk rundradio under trettiotalet* ["Including children is a good thing": school radio and the battle over children in Swedish broadcast radio in the 1930s]. PhD diss. Linköping: Linköping University.

Livingstone, S. (2003). On the Challenges of Cross-National Comparative Media Research. *European Journal of Communication*, *18*(4), 477–500. https://doi.org/10.1177/0267323103184003

Livingstone, S. (2012). Critical Reflections on the Benefits of ICT in Education. *Oxford Review of Education*, *38*(1), 9–24. https://doi.org/10.1080/03054985.2011.577938

Livingstone, S., d'Haenens, L., & Hasebrink, U. (2001). Childhood in Europe: Contexts for Comparation. In S. M. Livingstone & M. Bovill (Eds.), *Children and their changing media environment: a European comparative study* (pp. 3–30). Mahwah, N.J.: Lawrence Erlbaum Associates.

Livingstone, S., & Sefton-Green, J. (2016). *The class: living and learning in the digital age*. New York: New York University Press.

López, A. (2015). Ecomedia Literacy for Environmental Sustainability. In J. Singh, A. Grizzle, S. J. Yee & S. H. Culver (Eds.), *Media and Information Literacy for the Sustainable Development Goals* (The MILID yearbook) (pp. 299–306). Göteborg: Nordicom.

Lundahl, L. (2005). A Matter of Self-Governance and Control: The Reconstruction of Swedish Education Policy: 1980-2003. *European Education*, *37*(1), 10–25. https://doi.org/10.1080/10564934.2005.11042375

Lundahl, L. (2012). Educational Theory in an Era of Knowledge Capitalism. *Studies in Philosophy and Education*, *31*(3), 215–226. https://doi.org/10.1007/s11217-012-9304-9

Lupton, D., & Williamson, B. (2017). The datafied child: The dataveillance of children and implications for their rights. *New Media & Society*, *19*(5), 780–794. https://doi.org/10.1177/1461444816686328

Låby, E. (2018). *Vinnande bilder!: Teckningstävlingar för barn 1938–2000* [Winning pictures!: Art competitions for children 1938–2000]. PhD diss. Linköping: Linköping University.

Macho, T. (2013). Second-Order Animals: Cultural Techniques of Identity and Identification. *Theory, Culture & Society*, *30*(6), 30–47. https://doi.org/10.1177/0263276413499189

MacKenzie, D. A., & Wajcman, J. (Eds.). (1999). *The social shaping of technology* (2nd ed). Buckingham, UK; Philadelphia: Open University Press.

Manovich, L. (1999). Database as Symbolic Form. *Convergence: The International Journal of Research into New Media Technologies*, *5*(2), 80–99. https://doi.org/10.1177/135485659900500206

Marchessault, J. (2008). McLuhan's Pedagogical Art. *Flusser Studies*, *6*(1–13).

Marcus, G. (1995). *Technoscientific imaginaries: conversations, profiles and memoirs*. Chicago: University of Chicago Press.

Margolis, E. (2007). Guest Editor's Introduction. *Visual Studies*, *22*(1), 2–12. https://doi.org/10.1080/14725860601167127

Marklund, F. (2019). *Bilder som berättar: om kunskap, makt och traditioner i grundskolans bildundervisning* [Pictures that tell stories: knowledge, power and traditions in art education in compulsory school]. PhD diss. Umeå: Umeå University.

Marner, A., & Örtegren. (2014). Digitala medier i ett bildperspektiv [Digital media from the perspective of visual arts education]. In P.-O. Erixon (Ed.), *Skolämnen i digital förändring: en medieekologisk undersökning*. Lund: Studentlitteratur.

Marner, A., & Örtegren, H. (2013). Four approaches to implementing digital media in art education. *Education Inquiry*, *4*(4), 1–18. https://doi.org/10.3402/edui.v4i4.23217

Martínez, F. (2018). *Remains of the Soviet past in Estonia: an anthropology of forgetting, repair and urban traces*. London: UCL Press.

Marvin, C. (1988). *When old technologies were new: thinking about electric communication in the late nineteenth century*. New York: Oxford University Press.

Mason, L. (2016). McLuhan's Challenge to Critical Media Literacy: "The City as Classroom" Textbook. *Curriculum Inquiry*, *46*(1), 79–97. https://doi.org/10.1080/03626784.2015.1113511

Mateescu, A., & Elish, M. C. (2019). *AI in Context. The Labor of Integrating New Technologies.* New York: Data and Society Research Institute.

Mattern, S. (2013). Infrastructural Tourism. *Places Journal*. https://doi.org/10.22269/130701

Mattern, S. (2015). Deep Time of Media Infrastructure. In L. Parks & N. Starosielski (Eds.), *Signal Traffic: critical studies of media infrastructures* (pp. 94–112). Illinois: University of Illinois Press.

Mattern, S. (2016). Scaffolding, Hard and Soft: Critical and Generative Structures. *Spheres: Journal for Digital Cultures, 3*(Unstable infrastructures).

Mattern, S. (2017). *Code and clay, data and dirt: five thousand years of urban media*. Minneapolis, MN: University of Minnesota Press.

Mattsson, H. (2010). Real TV: architecture as social media. In S. Ericson & K. Riegert (Eds.), *Media houses: architecture, media and the production of centrality* (pp. 183–204). New York: Peter Lang.

McLuhan, M. (1960). Classroom without walls. In E. Carpenter & M. McLuhan (Eds.), *Explorations in communication: an anthology* (pp. 1–3). Boston: Beacon Press.

McLuhan, M. (1964). *Understanding Media: The Extensions of Man*. Corte Madera: Gingko Press.

McLuhan, M. (1967). *The Gutenberg galaxy: the making of typographic man*. Toronto: University of Toronto Press.

McLuhan, M., & Fiore, Q. (1967). *The medium is the massage: an inventory of effects*. Corte Madera, Calif.: Gingko Press.

McLuhan, M., Hutchon, K., & McLuhan, E. (1977). *City as classroom: Understanding language and media*. Agincourt, Ont: Book Society of Canada.

McNeil, M., Arribas-Ayllon, M., Haran, J., Mackenzie, A., & Tutton, R. (2017). Conceptualizing Imaginaries of Science, Technology, and Society. In U. Felt, R. Fouché, C. A. Miller, & L. Smith-Doerr (Eds.), *The handbook of science and technology studies* (4th ed). Cambridge, Mass.: MIT Press.

Meyrowitz, J. (1986). *No Sense of Place: The Impact of Electronic Media on Social Behavior*. New York: Oxford University Press.

Meyrowitz, J. (1998). Multiple media literacies. *Journal of Communication*, *48*(1), 96–108. https://doi.org/10.1111/j.1460-2466.1998.tb02740.x

Mickwitz, L. (2015). *En reformerad lärare: konstruktionen av en professionell och betygssättande lärare i skolpolitik och skolpraktik* [School reform and the teacher. The construction of a professional and assessing teacher in policy and teacher interviews]. PhD diss. Stockholm: Stockholm University.

Mihailidis, P. (2014). *Media literacy and the emerging citizen: youth, engagement and participation in digital culture*. New York: Peter Lang.

Mihailidis, P. (2019). *Civic media literacies: re-imagining human connection in an age of digital abundance*. New York: Routledge

Miller, T. (2015). The Art of Waste: Contemporary Culture and Unsustainable Energy Use. In L. Parks & N. Starosielski (Eds.), *Signal Traffic: critical studies of media infrastructures* (pp. 137–156). Illinois: University of Illinois Press.

Mårell-Olsson, E. (2012). *Att göra lärandet synligt?: individuella utvecklingsplaner och digital dokumentation* [Making learning visible? Personal development plans and digital documentation]. PhD diss. Umeå: Umeå University.

Mäe, R. (2017). The Story of e-Estonia: a Discourse Theoretical Approach. *Baltic Worlds*, *2017*(1–2), 32–44.

Narayan, K. (1993). How Native Is a "Native" Anthropologist? *American Anthropologist*, *95*(3), 671–686. https://doi.org/10.1525/aa.1993.95.3.02a00070

Nespor, J. (2000). Anonymity and Place in Qualitative Inquiry. *Qualitative Inquiry*, *6*(4), 546–569. https://doi.org/10.1177/107780040000600408

Nordström, G. Z. (1994). Bildlärarutbildningen [Art teacher training]. In G. Widengren & U. Beckman (Eds.), *Tanken och handen: Konstfack 150 år* (pp. 352–382). Stockholm: Page One Pub.

Nordström, G. Z. (2019). Medvetenhet och polariserande pedagogik [Awareness and polarizing pedagogy]. In A. Kockum, B. Alling-Ode, & U. Lind (Eds.), *Återkomsten: bilden, skolan och samhället 1968-2018* (pp. 37–47). Göteborg: Rojal förlag.

Ong, W. J. (1981). McLuhan as Teacher: The Future Is a Thing of the past. *Journal of Communication*, *31*(3), 129–135. https://doi.org/10.1111/j.1460-2466.1981.tb00436.x

Ong, W. J. (1982). *Orality and literacy: the technologizing of the word*. London: Methuen.

Opermann, S. (2014). *Generational use of news media in Estonia: media access, spatial orientations and discursive characteristics of the news media*. PhD diss. Huddinge: Södertörn University.

Orav, K. (2015). The Role of Visualizing Failure in Estonian Art, 1987–1999: The "Winners' Generation". *Signs and Society*, *3*(1), 103–131. https://doi.org/10.1086/680343

Orne, M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist*, *17*(11), 776–783. https://doi.org/10.1037/h0043424

Parikka, J. (2012). *What is media archaeology?* Cambridge: Polity.

Parikka, J. (2015). *A geology of media*. Minneapolis; London: University of Minnesota Press.

Parks, L. (2010). Around the Antenna Tree: The Politics of Infrastructural Visibility. *Flow*, *2010*(03).

Parks, L. (2013). Mapping Orbit: Toward a Vertical Public Space. In C. Berry, J. Harbord, & R. Moore (Eds.), *Public Space, Media Space* (pp. 61–87). https://doi.org/10.1057/9781137027764_4

Parks, L. (2015a). "Stuff you can kick": Toward a theory of media infrastructures. In P. Svensson & D. T. Goldberg (Eds.), *Between humanities and the digital* (pp. 355–373). Cambridge, Mass.: MIT Press.

Parks, L. (2015b). Water, Energy, Access: Materializing the Internet in Rural Zambia. In L. Parks & N. Starosielski (Eds.), *Signal Traffic: critical studies of media infrastructures* (pp. 115–136). Illinois: University of Illinois Press.

Parks, L. (2019a). Invisible Images. Lisa Parks in conversation with Trevor Paglen. In M.-P. Boucher, S. Helmreich, L. W. Kinney, S. Tibbits, R. Uchill & E. Ziporyn (Eds.), *Being material* (pp. 140-143). Cambridge, Mass.: MIT Press.

Parks, L. (2019b). *Glimpses of Network Sovereignty: Materialities of Media Infrastructure in Tanzania*. Paper presented at the conference Infrastructures and Inequalities: Media Industries, Digital Cultures and Politics, 2019, University of Helsinki, Finland.

Parks, L., & Starosielski, N. (Eds.) (2015). *Signal Traffic: critical studies of media infrastructures*. Illinois: University of Illinois Press.

Perselli, A.-K. (2014). *Från datasal till en-till-en: en studie av lärares erfarenheter av digitala resurser i undervisningen* [From computer classroom to one laptop per child: a study of teachers' experiences of digital resources in eduction]. PhD diss. Härnösand: Mid Sweden University.

Peters, J. D. (1999). *Speaking into the air: a history of the idea of communication*. Chicago, Ill.: University of Chicago Press.

Peters, J. D. (2010). Introduction: Friedrich Kittler's Light Shows. In F. Kittler, *Optical media: Berlin lectures 1999*. Cambridge: Polity Press.

Peters, J. D. (2013). Calendar, Clock, Tower. In J. Stolow (Ed.), *Deus in machina: religion, technology, and the things in between* (pp. 25–42). New York: Fordham University Press.

Peters, J. D. (2015a). Infrastructuralism: Media as Traffic between Nature and Culture. In M. Näser-Lather & C. Neubert (Eds.), *Traffic* (pp. 29–49). https://doi.org/10.1163/9789004298774_003

Peters, J. D. (2015b). *The marvelous clouds: toward a philosophy of elemental media*. Chicago: University of Chicago Press.

Peters, J. D. (2017). "You Mean My Whole Fallacy Is Wrong": On Technological Determinism. *Representations*, *140*(1), 10–26. https://doi.org/10.1525/rep.2017.140.1.10

Pettersson, S., & Åsén, G. (1989). *Bildundervisningen och det pedagogiska rummet: Traditioner, föreställningar och undervisningsprocess inom skolämnet teckning/bild i grundskolan* [Visual arts education and the pedagogical space: Traditions, imaginaries and teaching processes in drawing and visual arts education in compulsory schools]. PhD diss. Stockholm: Stockholm University.

Piirimäe, H. (1997). Estonia and her Nordic Neighbors. In L. Weibull, K. E. Rosengren, S. Holmberg, P. Vihalemm, & M. Lauristin (Eds.), *Return to the Western world: cultural and political perspectives on the Estonian post-communist transition* (pp. 43–72). Tartu: Tartu University Press.

Pilve, E. (2014). Ideological Pressure in School Lessons in the Estonian SSR. In M. Saueauk (Ed.), *Historical Memory versus Communist Identity*. (pp. 45–70). Tartu: University of Tartu Press.

Pink, S. (2007). Walking with video. *Visual Studies*, *22*(3), 240–252. https://doi.org/10.1080/14725860701657142

Pink, S. (2013). *Doing visual ethnography*. Los Angeles: SAGE.

Pipek, V., & Wulf, V. (2009). Infrastructuring: Toward an Integrated Perspective on the Design and Use of Information Technology. *Journal of the Association for Information Systems*, *10*(5), 447–473. https://doi.org/10.17705/1jais.00195

Pitt, J., & Pavlova, M. (2001). Pedagogy in Transition: From Labour Training to Humanistic Technology Education in Russia. In S. L. Webber & I. Liikanen (Eds.), *Education and civic culture in post-communist countries* (pp. 231–247). Basingstoke: Palgrave.

Player-Koro, C. (2013). Hype, hope and ICT in teacher education: a Bernsteinian perspective. *Learning, Media and Technology*, *38*(1), 26–40. https://doi.org/10.1080/17439884.2011.637503

Player-Koro, C. (2018). Skolans digitalisering. Ett kritiskt perspektiv [The digitalization of schools. A critical perspective]. In U. Carlsson (Ed.), *Medie- och informationskunnighet (MIK) i den digitala tidsåldern: en demokratifråga: kartläggning, analys, reflektioner* (pp. 69–72). Göteborg: Nordicom.

Player-Koro, C., Rensfeldt, A. B., & Selwyn, N. (2018). Selling tech to teachers: education trade shows as policy events. *Journal of Education Policy*, *33*(5), 682–703. https://doi.org/10.1080/02680939.2017.1380232

Postman, N. (1979). *Teaching as a conserving activity*. New York: Delacorte Press.

Postman, N. (1986). *Amusing ourselves to death: public discourse in the age of show business*. New York: Penguin Books.

Postman, N. (1993). *Technopoly: the surrender of culture to technology*. New York: Vintage Books.

Prosser, J. (2007). Visual methods and the visual culture of schools. *Visual Studies*, *22*(1), 13–30. https://doi.org/10.1080/14725860601167143

Pruulmann-Vengerfeldt, P., Runnel, P., & Aljas, A. (2013). Orienting the Heritage Institution towards Participatory Users in the Internet. In P. Runnel, P. Pruulmann-Vengerfeldt, P. Viires, & M. Laak (Eds.), *The digital turn: user's practices and cultural transformations* (pp. 13–25). Frankfurt am Main: Peter Lang GmbH.

Putko, A. (1972). Aesthetic Education in Soviet Schools. *Elementary School Journal*, *72*(8), 397–401. https://doi.org/10.1086/460719

Pötzsch, H. (2016). Materialist perspectives on digital technologies; informing debates on digital literacy and competence. *Nordicom Review, 37*, 119–132.

Rahm, L. (2019). *Educational imaginaries: a genealogy of the digital citizen*. PhD diss. Linköping: Linköping University.

Redmond, T. (2019). Media literacy as eco-justice pedagogy. *Media Education*, *10*(1), 69–90. https://doi.org/10.14605/MED1011905

Rensfeldt, A. B., Hillman, T., & Selwyn, N. (2018). Teachers 'liking' their work? Exploring the realities of teacher Facebook groups. *British Educational Research Journal*, *44*(2), 230–250. https://doi.org/10.1002/berj.3325

Ribes, D., & Finholt, T. A. (2009). The Long Now of Technology Infrastructure: Articulating Tensions in Development. *J. AIS*, *10*, 5. https://doi.org/10.17705/1jais.00199

Richardson, G. (2010). *Svensk utbildningshistoria: skola och samhälle förr och nu* [Swedish educational history: school and society in the past and present] (8th ed). Lund: Studentlitteratur.

Riis, U. (2000). Skolans datorisering under 1980- och 90-talen [The computerization of schools in the 1980s and 90s]. In U. Riis & Skolverket (Eds.), *IT i skolan mellan vision och praktik: en forskningsöversikt* (pp. 9–18). Stockholm: Skolverket: Liber distribution.

Ringarp, J. (2008). Lärarkårens kommunalisering. En studie över de olika lärarförbundens ställningstaganden utifrån ett professionaliseringsperspektiv [The municipalization of teachers. A study of the positions of different teacher unions from a professionalization perspective]. In E. Larsson (Ed.), *Ny utbildningshistorisk forskning: Tio bidrag från Nationella forskarskolan i utbildningshistoria* (Vol. 209, pp. 154–168). Uppsala: Föreningen för svensk undervisningshistoria.

Rose, G. (2012). *Visual methodologies: an introduction to researching with visual materials*. London: Sage.

Rossiter, N. (2017). *Software, infrastructure, labor: a media theory of logistical nightmares*. New York: Routledge.

Rõuk, V., Van Der Walt, J. L., & Wolhuter, C. C. (2017). The Science of Pedagogy in Soviet Estonia (1944-1991): Resilience in the Face of Adversity. *History of Education*, *47*(1), 108–124. https://doi.org/10.1080/0046760X.2017.1373305

Runnel, P., Pruulmann-Vengerfeldt, P., & Reinsalu, K. (2009). The Estonian Tiger Leap from Post-Communism to the Information Society: From Policy to Practice. *Journal of Baltic Studies*, *40*(1), 29–51. https://doi.org/10.1080/01629770902722245

Ryan, G. W., & Bernard, H. R. (2003). Techniques to Identify Themes. *Field Methods*, *15*(1), 85–109. https://doi.org/10.1177/1525822X02239569

Salavati, S. (2016). *Use of digital technologies in education: the complexity of teachers' everyday practice*. PhD diss. Växjö: Linnaeus University.

Sandin, B., & Sundkvist, M. (2014). *Barn, barndom och samhälle: svensk utbildningshistoria* [Children, childhood and society: Swedish educational history]. Malmö: Gleerups.

Šapovalenko, S. G. (1963). *Polytechnical education in the U.S.S.R.* Paris: Unesco.

Sarv, E.-S. (2014). A status paper on school teacher training in Estonia. *Journal of International Forum of Educational Research*, *1*(2), 106–158.

Saunders, B., Kitzinger, J., & Kitzinger, C. (2015). Anonymising interview data: challenges and compromise in practice. *Qualitative Research*, *15*(5), 616–632. https://doi.org/10.1177/1468794114550439

Sawyer, S., Erickson, I., & Hossein Jarrahi, M. (2019). Infrastructural Competence. In J. Vertesi & D. Ribes (Eds.), *digitalSTS: A Field Guide for Science et Technology Studies*. https://doi.org/10.1515/9780691190600

Schönau, D., & Kárpáti, A. (2019). Renaming the framework: Common European Framework of Reference for Visual Competency. *International Journal of Education Through Art*, *15*(1), 95–100. https://doi.org/10.1386/eta.15.1.95_1

Schüttpelz, E. (2006). The media-anthropological turn of cultural techniques. In L. Engell, B. Siegert, & J. Vogl (Eds.), & A. Christensen (Trans.), *Kulturgeschichte als Mediengeschichte* (1.,).

Selwyn, N. (2011a). *Education and technology: key issues and debates*. London: Continuum.

Selwyn, N. (2011b). Technology, media and education: telling the whole story. *Learning, Media and Technology*, *36*(3), 211–213. https://doi.org/10.1080/17439884.2011.572977

Selwyn, N. (2014a). Data Entry: Towards the Critical Study of Digital Data and Education. *Learning, Media and Technology*, *40*(1), 64–82. https://doi.org/10.1080/17439884.2014.921628

Selwyn, N. (2014b). *Distrusting educational technology: critical questions for changing times*. New York: Routledge.

Selwyn, N., & Facer, K. (2013). Introduction: The Need for a Politics of Education and Technology. In N. Selwyn & K. Facer (Eds.), *The politics of education and technology: conflicts, controversies, and connections* (pp. 1–17). New York: Palgrave Macmillan.

Sepp, E. (2002). Estonian nonconformist art from the Soviet occupation in 1944 to Perestroika. In A. Rosenfeld, N. T. Dodge, & Jane Voorhees Zimmerli Art Museum (Eds.), *Art of the Baltics: the struggle for freedom of artistic*

expression under the Soviets, 1945-1991: [Estonia, Latvia, Lithuania] (pp. 43–140). New Brunswick, NJ: Rutgers University Press.

Siegert, B. (2013). Cultural Techniques: Or the End of the Intellectual Postwar Era in German Media Theory. *Theory, Culture & Society*, *30*(6), 48–65. https://doi.org/10.1177/0263276413488963

Siegert, B. (2015). *Cultural techniques: grids, filters, doors, and other articulations of the real*. New York: Fordham University Press.

Siibak, A., Forsman, M., & Hernwall, P. (2014). Employing Creative Research Methods with Tweens in Estonia and Sweden: Reflections on a Case Study of Identity Construction on Social Networking Sites. In K. Bredl, J. Hunniger, & J. L. Jensen (Eds.), *Methods for analyzing social media* (pp. 250–261). London: Routledge.

Simon, B. (1954). Polytechnical education in Soviet schools. *The Vocational Aspect of Education*, *6*(12), 3–13. https://doi.org/10.1080/03057875480000011

Simone, A. (2004). People as Infrastructure: Intersecting Fragments in Johannesburg. *Public Culture*, *16*(3), 407–429. https://doi.org/10.1215/08992363-16-3-407

Sims, C. (2017). *Disruptive fixation: school reform and the pitfalls of techno-idealism*. Princeton: Princeton University Press.

Skantze, A. (1989). *Vad betyder skolhuset?: Skolans fysiska miljö ur elevernas perspektiv studerad i relation till barns och ungdomars utvecklingsuppgifter* [What is the significance of the school building?: The physical environment of the school seen from a pupil perspective and studied in relation to their developmental tasks]. PhD diss. Stockholm: Stockholm University.

Skåreus, E. (2007). *Digitala speglar: föreställningar om lärarrollen och kön i lärarstudenters bilder* [Digital mirrors: Conceptions of the teacher role and gender in the pictures of student teachers]. PhD diss. Umeå: Umeå University.

Small, R. (1984). The Concept of Polytechnical Education. *British Journal of Educational Studies*, *32*(1), 27–44. https://doi.org/10.2307/3121124

Star, S. L. (1991). Invisible work and silenced dialogues in knowledge representation. In I. Eriksson, B. Kitchenham, & K. Tijdens (Eds.), *Women, work and computerization: understanding and overcoming bias in work and education. Proceedings of the IFIP TC9/WG9.1 Conference on Women, Work and Computerization, Helsinki, Finland, 30 June–2 July, 1991* (pp. 81–92). Amsterdam: North-Holland.

Star, S. L. (1999). The Ethnography of Infrastructure. *American Behavioral Scientist*, *43*(3), 377–391. https://doi.org/10.1177/00027649921955326

Star, S. L., & Griesemer, J. R. (1989). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, *19*(3), 387–420. https://doi.org/10.1177/030631289019003001

Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, *7*(1), 111–134. https://doi.org/10.1287/isre.7.1.111

Star, S. L., & Strauss, A. (1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. *Computer Supported Cooperative Work (CSCW)*, *8*(1–2), 9–30. https://doi.org/10.1023/A:1008651105359

Strong-Wilson, T., & Ellis, J. (2007). Children and Place: Reggio Emilia's Environment as Third Teacher. *Theory Into Practice*, *46*(1), 40–47.

Sturken, M., & Cartwright, L. (2009). *Practices of looking: an introduction to visual culture*. New York: Oxford University Press.

Ståhlberg, P. (2006). On the journalist beat in India: Encounters with the near familiar. *Ethnography*, *7*(1), 47–67. https://doi.org/10.1177/1466138106064827

Ståhle, Y. (2006). *Pedagogiken i tiden: om framväxten av nya undervisningsformer under tidigt 2000-tal – exemplet Kunskapsskolan* [Pedagogy of today: On the development of new teaching methods during the early 2000's. A case study of Kunskapsskolan]. PhD diss. Stockholm: Stockholm University.

Stöger, G. (2016). Premodern sustainability? The secondhand and repair trade in urban Europe. In R. Oldenziel & H. Trischer (Eds.), *Cycling and recycling: histories of sustainable practices* (pp. 147–167). New York: Berghahn Books.

Suchman, L. (1995). Making work visible. *Communications of the ACM*, *38*(9), 56–64. https://doi.org/10.1145/223248.223263

Suchman, L. (2002). Located accountabilities in technology production. *Scandinavian Journal of Information Systems*, *14*(2).

Säljö, R. (2012). Literacy, Digital Literacy and Epistemic Practices: The Co-Evolution of Hybrid Minds and External Memory Systems. *Nordic Journal of Digital Literacy*, *7*(01), 5–19.

Söderlund, A. (2000). *Det långa mötet – IT och skolan: om spridning och anammande av IT i den svenska skolan* [A long encounter – ICT and school: About diffusion and acceptance of ICT in the Swedish school system]. PhD diss. Luleå: Luleå Technical University.

Sørensen, E. (2009). *The materiality of learning technology and knowledge in educational practice*. Cambridge: University Press.

Tallvid, M. (2015). *1:1 i klassrummet: analyser av en pedagogisk praktik i förändring* [1:1 in the classroom: Analysing pedagogical practices in transformation]. PhD diss. Gothenburg: University of Gothenburg.

Tavin, K. (2003). Wrestling with Angels, Searching for Ghosts: Toward a Critical Pedagogy of Visual Culture. *Studies in Art Education*, *44*(3), 197–213. https://doi.org/10.1080/00393541.2003.11651739

Tavin, K. (2005a). Hauntological Shifts: Fear and Loathing of Popular (Visual) Culture. *Studies in Art Education*, *46*(2), 101–117. https://doi.org/10.1080/00393541.2005.11651784

Tavin, K. (2005b). Opening Re-Marks: Critical Antecedents of Visual Culture in Art Education. *Studies in Art Education*, *47*(1), 5–22. https://doi.org/10.1080/00393541.2005.11652810

Temple, B., Edwards, R., & Alexander, C. (2006). Grasping at Context: Cross Language Qualitative Research as Secondary Qualitative Data Analysis.

Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, *7*(4). https://doi.org/10.17169/fqs-7.4.176

Temple, B., & Young, A. (2004). Qualitative Research and Translation Dilemmas. *Qualitative Research*, *4*(2), 161–178. https://doi.org/10.1177/1468794104044430

Thunman, E., & Persson, M. (2017). Boundary practices and social media: The case of teachers' use of Facebook to communicate with pupils. *Human IT*, *13*(3), 24–48.

Titma, M., Tuma, N. B., & Silver, B. D. (1998). Winners and Losers in the Postcommunist Transition: New Evidence from Estonia. *Post-Soviet Affairs*, *14*(2), 114–136. https://doi.org/10.1080/1060586X.1998.10641449

Tolich, M. (2004). Internal Confidentiality: When Confidentiality Assurances Fail Relational Informants. *Qualitative Sociology*, *27*(1), 101–106. https://doi.org/10.1023/B:QUAS.0000015546.20441.4a

Toots, A., & Laanpere, M. (2005). Tiger in Focus – A National Survey of ICT in Estonian Schools. *Educational Media International*, *41*(1), 7–18. https://doi.org/10.1080/0952398032000105049

Tuul, M., Ugaste, A., & Mikser, R. (2011). Teachers' perceptions of the curricula of the Soviet and post-Soviet eras: A case study of Estonian pre-school teachers. *Journal of Curriculum Studies*, *43*(6), 759–781. https://doi.org/10.1080/00220272.2011.596225

Törnquist, A. (2017). Väggarnas koreografi och våra framtidsutmaningar [The choreography of walls and our future challanges]. In L. Daram & S. de Laval (Eds.), *Skolans nya rum: en antologi om samspelet mellan pedagogik och arkitektur* (pp. 37–54). Stockholm: Stiftelsen Arkus.

Ugur, K., & Harro-Loit, H. (2010). Media Literacy in the Estonian National Curriculum. In S. Kotilainen & S.-B. Arnolds-Granlund (Eds.), *Media literacy education: Nordic perspectives* (pp. 133–144). Göteborg: Nordicom.

Vahter, E. (2015). Potential Teaching Model for Applying Novel Approaches of Renewed Estonian National Curriculum into Visual Art Classes in Primary School. *Education 3-13*, *43*(3), 263–13, 2015, Vol.43(3), 263–278. https://doi.org/10.1080/03004279.2013.811435

Vahter, E. (2016). Looking for a Possible Framework to Teach Contemporary Art in Primary School. *International Journal of Art & Design Education*, *35*(1), 51–67. https://doi.org/10.1111/jade.12046

Vahter, E. (2018). Changes in Visual Art Education – A Challenge for Estonian Kindergarten Teachers? *Education 3-13*, *46*(5), 578–13, 2018, Vol.46(5), 578–586. https://doi.org/10.1080/03004279.2017.1329332

Varik, V. (2013). Teacher education in Estonia. In I. Ķestere, A. Krūze, & Baltic Association of Educational Historians (Eds.), *History of pedagogy and educational sciences in the Baltic countries from 1940 to 1990* (pp. 193–200). Riga: RaKa.

Vasari, G. (1568/1998). *The lives of the artists*. Oxford; New York: Oxford University Press.

Velkova, J. (2017). *Media Technologies in the Making: User-driven Software and Infrastructures for Computer Graphics Production.* PhD diss. Huddinge: Södertörn University.

Velkova, J., & Kaun, A. (2019). Algorithmic resistance: media practices and the politics of repair. *Information, Communication & Society*, 1–18. https://doi.org/10.1080/1369118X.2019.1657162

Viirpalu, P., Krull, E., & Mikser, R. (2016). Investigating Estonian Teachers' Expectations for the General Education Curriculum. *Journal of Teacher Education for Sustainability*, *16*(2), 54–70. https://doi.org/10.2478/jtes-2014-0011

Viktorova, E., Ostashova, N., & Shevchenko, T. (2015). Dual Education in Russia: Historical Background and Modern State. In B. S. Academy, P. Jarke, & M. Hogeforster (Eds.), *Work-based learning around the mare balticum* (pp. 80–93). BoD – Books on Demand.

Vismann, C. (2013). Cultural Techniques and Sovereignty. *Theory, Culture & Society*, *30*(6), 83–93. https://doi.org/10.1177/0263276413496851

Walford, G. (2005). Research ethical guidelines and anonymity. *International Journal of Research & Method in Education*, *28*(1), 83–93. https://doi.org/10.1080/01406720500036786

Wetterholm, H. (2001). *En bildpedagogisk studie: lärare undervisar och elever gör bilder* [An art educational study: teachers teach and the pupils make images]. PhD diss. Malmö: Malmö University.

Williams, R. (1976). *Keywords: A Vocabulary of Culture and Society*. London: Fontana.

Williamson, B. (2013). Networked Cosmopolitanism? Shaping Learners by Remaking the Curriculum of the Future. In N. Selwyn & K. Facer (Eds.), *The politics of education and technology: conflicts, controversies, and connections* (pp. 39–59). New York: Palgrave Macmillan.

Williamson, B. (2014). Governing Software: Networks, Databases and Algorithmic Power in the Digital Governance of Public Education. *Learning, Media and Technology*, *40*(1), 83–105. https://doi.org/10.1080/17439884.2014.924527

Williamson, B. (2016). Silicon startup schools: technocracy, algorithmic imaginaries and venture philanthropy in corporate education reform. *Critical Studies in Education*, *0*(0), 1–19. https://doi.org/10.1080/17508487.2016.1186710

Williamson, B. (2017). *Big data in education: the digital future of learning, policy and practice*. Los Angeles: SAGE.

Wilson, C., Grizzle, A., Tuazon, R., Akyempong, K., & Cheung, C. K. (2013). *Media and information literacy curriculum for teachers: Curriculum and Competency Framework*. Paris: UNESCO Publishing.

Winman, T. (2018). *Digitaliseringen i skolan: möjligheter och utmaningar*. Stockholm: Skolverket.

Winthrop-Young, G. (2013). Cultural Techniques: Preliminary Remarks. *Theory, Culture & Society*, *30*(6), 3–19.

https://doi.org/10.1177/0263276413500828

Winthrop-Young, G. (2014). The Kultur of Cultural Techniques: Conceptual Inertia and the Parasitic Materialities of Ontologization. *Cultural Politics an International Journal*, *10*(3), 376–388. https://doi.org/10.1215/17432197-2795741

Young, L. C. (2015). Cultural Techniques and Logistical Media: Tuning German and Anglo-American Media Studies. *M/C Journal*, *18*(2).

Young, L. C. (2017). Imagination and Literary Media Theory. *Media Theory*, *1*, *Manifestos*, 17–33.

Yurchak, A. (2003). Soviet Hegemony of Form: Everything Was Forever, Until It Was No More. *Comparative Studies in Society and History*, *45*(3), 480–510. https://doi.org/10.1017/S0010417503000239

Yusov, B. (1978). Art Education in the Union of Soviet Socialist Republics. *Art Education*, *31*(2), 8–11. https://doi.org/10.2307/3192308

Zajda, J. I. (1980). *Education in the USSR*. Oxford: Pergamon.

Zielinski, S. (2006). *Deep time of the media: toward an archaeology of hearing and seeing by technical means*. Cambridge, Mass.: MIT Press.

Žukovs, L. (2013). System of teacher preparation under Soviet rule. In I. Ķestere, A. Krüze, & Baltic Association of Educational Historians (Eds.), *History of pedagogy and educational sciences in the Baltic countries from 1940 to 1990* (pp. 182-183). Riga: RaKa.

Åsén, G. (2006). Varför bild i skolan? – en historisk tillbakablick på argument för ett marginaliserat skolämne [Why arts education? – a retrospective view on arguments for a marginalized school subject]. In U. P. Lundgren & Vetenskapsrådet (Eds.), *Uttryck, intryck, avtryck: lärande, estetiska uttrycksformer och forskning* (pp. 107–122). Stockholm: Vetenskapsrådet.

Åsén, G. (2017). Bild – ett ämne med starka traditioner och stora potentialer [Visual arts education – a school subject with strong traditions and big potential]. In G. Åsén (Ed.), *Bildundervisning och lärande genom bilder* (pp. 13–27). Stockholm: Liber.

Öhman-Gullberg, L. (2008). *Laddade bilder: representation och meningsskapande i unga tjejers filmberättande* [Ambiguous images: Representation and meaning making in young girls' film making]. PhD diss. Stockholm: Stockholm University.

Other sources

Deloitte & Touche, European Commission, Directorate General for Communications Networks, C. and T., & Ipsos MORI. (2019a). *2nd survey of schools: ICT in education: Estonia country report*. Retrieved October 17, 2019 from http://publications.europa.eu/publication/manifestation_identifier/PUB_KK0119083ENN

Deloitte & Touche, European Commission, Directorate General for Communications Networks, C. and T., & Ipsos MORI. (2019b). *2nd survey of*

schools: ICT in education: Sweden country report. Retrieved October 17, 2019 from http://publications.europa.eu/publication/manifestation_identifier/PUB_KK0419094ENN

EKA. (2019). Kunstiharidus [Art education]. Retrieved June 24, 2019, from Estonian Academy of Arts website: https://www.artun.ee/erialad/kunstiharidus/

Enterprise Estonia, & Estonian Investment Agency. (2017). e-Estonia — We have built a digital society and so can you. Retrieved August 20, 2017, from e-Estonia website: https://e-estonia.com

Estonian Ministry of Education and Research. (2014a). *National Curriculum for Basic Schools: Art Subjects*. Retrieved October 11, 2017, from https://www.hm.ee/sites/default/files/est_basic_school_nat_cur_2014_appendix_6_final.pdf

Estonian Ministry of Education and Research. (2014b). *National Curriculum for Basic Schools: Technology*. Retrieved October 11, 2017, from https://www.hm.ee/sites/default/files/est_basic_school_nat_cur_2014_appendix_7_final.pdf

Estonian Ministry of Education and Research, Innove foundation, Information Technology Foundation for Education, & University of Tartu. (2014). *Estonia's Lifelong Learning Strategy 2020*. Retrieved August 20, 2017, from https://www.hm.ee/sites/default/files/estonian_lifelong_strategy.pdf

Estonian Ministry of Economy and Communication. (2014). *Digital Agenda 2020 for Estonia*. Government of Estonia. Retrieved August 20, 2017, from https://www.mkm.ee/sites/default/files/digitalagenda2020_final.pdf

European Commission, EACEA, & Eurydice. (2018). *The structure of the European education systems 2018/19: schematic diagrams*. Retrieved February 5, 2020 from Publications Office of the European Union website: http://publications.europa.eu/publication/manifestation_identifier/PUB_ECAL18001ENN

#HITSA. (2015). HITSA õpilaskonkurss 2015/2016 [HITSA student competitions]. Retrieved July 7, 2017, from Estonian Information Technology Foundation for Education website: https://www.hitsa.ee/about-us/historical-overview

Kalm, M. (2017). 100 Years of Art Education in Tallinn. Retrieved June 5, 2019, from Estonian Academy of Arts website: https://www.artun.ee/en/academy/about/history/

Kerb, A. (2015). Minister Ligi: All school studies digital by 2020 | Estonian Ministry of Education and Research. Retrieved August 20, 2017, from https://www.hm.ee/en/news/minister-ligi-all-school-studies-digital-2020

Lees, M. (2016). *Estonian education system 1990-2016. Reforms and their impact*, Estonian Ministry of Education and Research. Retrieved November 8, 2019 from http://4liberty.eu/wp-content/uploads/2016/08/Estonian-Education-System_1990-2016.pdf

OECD. (2001). *Reviews of National Policies for Education: Estonia 2001*. https://doi.org/10.1787/9789264189966-en

OECD. (2016). *Estonia Country Note: Pisa High Performers*. Retrieved June 25, 2019 from https://www.oecd.org/pisa/PISA-2015-estonia.pdf

Otsmaa, S. (2018). Estonia supports education technology startups | Estonian Ministry of Education and Research. Retrieved May 21, 2019, from https://www.hm.ee/en/news/estonia-supports-education-technology-startups

Põldma, A., & Puur, A. (2014). *Educational Policies: Estonia (2014)*. Retrieved October 9, 2017, from http://www.perfar.eu/policy/education/estonia

Prop 2009/10:89, Swedish Government (2009). *Regeringens proposition 2009/10:89 Bäst i klassen – en ny lärarutbildning* [Government bill 2009/10:89: Top of the class – a new model for teacher training]. Retrieved July 24, 2019, from https://www.regeringen.se/rattsliga-dokument/proposition/2010/02/prop.-20091089/

Ruus, V.-R. (2012a). *Public education as the basis of independent nationhood*. Retrieved October 9, 2017, from Estonica, web encyclopaedia by the Estonian Institute website: http://www.estonica.org/en/

Ruus, V.-R. (2012b). *The history of Estonian education – the story of the intellectual liberation of a nation*. Retrieved October 9, 2017, from Estonica, web encyclopaedia by the Estonian Institute website: http://www.estonica.org/en/

SCB. (2020). Statistikmyndigheten SCB – Befolkningsstatistik [Statistics Sweden – Population]. Retrieved February 5, 2020, from https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning/befolkningens-sammansattning/befolkningsstatistik/

Statistics Estonia. (2020). Statistics Estonia - Population. Retrieved February 5, 2020, from https://www.stat.ee/population

Swedish Government Official Reports (SOU series) SOU 2008:109. (2008). *En hållbar lärarutbildning. Betänkande av Utredningen om en ny lärarutbildning (HUT 07)*. [A sustainable teacher training. Commission report on a new model for teacher training (HUT 07)]. Stockholm: Fritze.

Swedish National Agency for Education (2017). *Läroplan för grundskolan, förskoleklassen och fritidshemmet 2011 (Reviderad 2017)* [Curriculum for the compulsory school, preschool class and the recreation centre (Revised 2017)]. Retrieved November 26, 2017, from https://www.skolverket.se/laroplaner-amnen-och-kurser/grundskoleutbildning/grundskola/laroplan

Swedish National Agency for Education (2020). Statistik [Statistics]. Retrieved February 12, 2020, from https://www.skolverket.se/skolutveckling/statistik

Swedish National Agency for Education (n.d.). *Digital kompetens i ämnet bild* [Digital competence in visual arts education]. Audio podcast. Retrieved July 18, 2019, from https://soundcloud.com/skolverket/digital-kompetens-i-amnet-bild

Tamul, S. (2009). Facts about the History of the University of Tartu. Retrieved June 3, 2019, from Tartu University website: https://www.ut.ee/en/university/general/history

TLÜ. (2019a). History | Tallinn University. Retrieved June 26, 2019, from Tallinn University website: https://www.tlu.ee/en/history

TLÜ. (2019b). Kunstiõpetaja | Tallinna Ülikool [Art education| Tallinn University]. Retrieved June 24, 2019, from Tallinn University website: https://www.tlu.ee/bfm/kunstiopetaja

UNESCO, & Education for All (Eds.). (2005). *Literacy for life. EFA global monitoring report*. Paris: UNESCO.

TÜ. (2018, January 29). Teacher of Arts and Technology (MA). Retrieved June 26, 2019, from Tartu University website: https://www.kultuur.ut.ee/en/departments/teacher-arts-and-technology-ma

Appendices

Appendix 1: Interview guide

About the project

- Background information about the dissertation project – the relationship between media technologies and visual arts education
- Information about the interview situation – duration: ca 2 hrs. You will be anonymized and can withdraw your participation at any time. Can I record? Can I take photographs?

Background and traditions

- Can you tell me a little bit about your background, how you got into visual arts education?
- What major changes have you experienced during your working life?

Practice and infrastructure[1]

- What material conditions do you need to perform the kind of teaching that you want to?
- What media do you use to communicate with colleagues? With students? Why? Can you show me?
- Do you use any kind of textbook or other teaching material? Why? Can you show me?
  + targeted questions about specific projects or practices the participant is involved in.

Future imaginaries

- Why is visual arts education important? If you could choose only a few things (in terms of competences, skills or approaches) that your students should take with them from this education, what would that be?
- How do you imagine visual arts education in 10 years? In 20?

Thank you and contact details

—

[1] The questions in this section depended very much on the experience and position of that specific participant. Since most of the participants were involved in some kind of teaching, the first three questions were posed in most interviews but not, for example, to managers or textbook authors.

Appendix 2: Workshop invitation

SÖDERTÖRN UNIVERSITY | STOCKHOLM
sh.se

2017-01-13

Workshop invitation for art teacher students:

Tomorrow's art classroom – technologies for image making and communication

Education todays is increasingly mediated by technology; teaching materials, tools for communication and as data driven evaluation of schools and learning. At the same time, schools are situated in a mediatized society where the borders between formal and informal learning are blurred, and where social media is used in teaching and as a way for teachers to collaborate. These changes are especially apparent in art education, a subject that is shaped in relation to technologies for image making.

My name is Ingrid Forsler and I'm a PhD student in media and communication studies at Södertörn University in Stockholm, Sweden. My dissertation focuses on this relation between visual art education in Sweden and Estonia and different technologies. It departs from the idea that the technologies used in art education are connected to certain ideas about learning, creativity and citizenship. As part of this work, **I would like to meet you as an art teacher student** to learn more about your thoughts on the role of art education in a mediatized society.

The theme for the workshop is the **art classroom**, both as a physical space and a virtual one, including online places and digital communication. We meet in groups of 6 students and me as a researcher, and create images or maps of tomorrow's art classroom together. During the workshop there will be sandwiches, cake and coffee/tea.

The workshop takes place at TLU and takes about two hours. The discussion will be recorded but all material will be anonymized before the results are published. You can withdraw your participation in the project at any time.

There will be two workshops at TLU between the 13th and 17th of February 2017.

I hope you want to participate in one of these! Please register your interest, and what dates/times you are available to me on ingrid.forsler@sh.se before the 1st of February, and don't hesitate contact me or [redacted] if you have any questions.

INGRID FORSLER DOKTORAND
ingrid.forsler@sh.se
0736 247 006

SÖDERTÖRNS HÖGSKOLA | STOCKHOLM
Institutionen för kultur och lärande

Appendix 3: Workshop guide

Material: A0/A1 cardboard (white); coloured paper; scissors; black markers 0.3-2.0 mm; glue sticks

1. Preparation phase

Background information about the dissertation project – the relation between media technologies and visual arts education

Information about participation – duration: ca 2 hrs. You will be anonymized and can withdraw your participation at any time. Can I record? Can I take photographs? Can I take the finished map with me?

Information about the workshop – divided into three phases: presentation (what we are doing right now), mapping, and a collective re-mapping. Feel free to be very utopian and creative during the last phase – you don't have to adjust to current constraints.

Presentation round – name and interest in the project. Second round trying to define the terms *media* and *infrastructure*, including obsolete and invisible media, summed up by me at the end.

2. Critique phase

a, Can you draw all the media technologies in this room?

b, Can you draw all the media technologies you have encountered during your university education?

c, Can you draw all the media technologies you have encountered during your practice period or elsewhere in basic schools?

Images are cut out by me and the participants and placed on the big cardboard.

3. Fantasy phase

Ask the participants: What will still be around in 10-20 years? What is new? Can you draw that? Can you organize this into an art classroom in the extended sense, that would facilitate the kind of visual arts education you want to see 20 years from now? You can use the cut-outs and make new ones and draw directly on the board.

Throughout the fantasy phase, the participants are asked to visualize oral statements, i.e. "If you want this material to be mobile, can you get that into the map somehow?"

When almost two hours have passed, the participants are asked to describe their map to me. The cut-outs are then glued to the board by me and/or the participants.

Thank you and providing contact details.

Appendix 4: Classroom maps from workshops

Figure 19. Map from workshop (wsS1)

Figure 20. Map from workshop (wsS2)

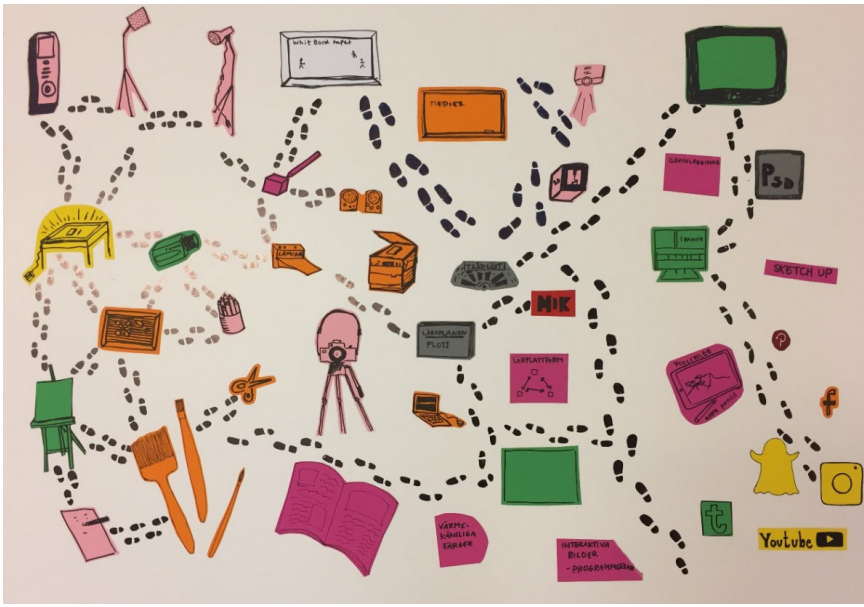


Figure 21. Map from workshop (wsS3)

Figure 22. Map from workshop (wsS4)

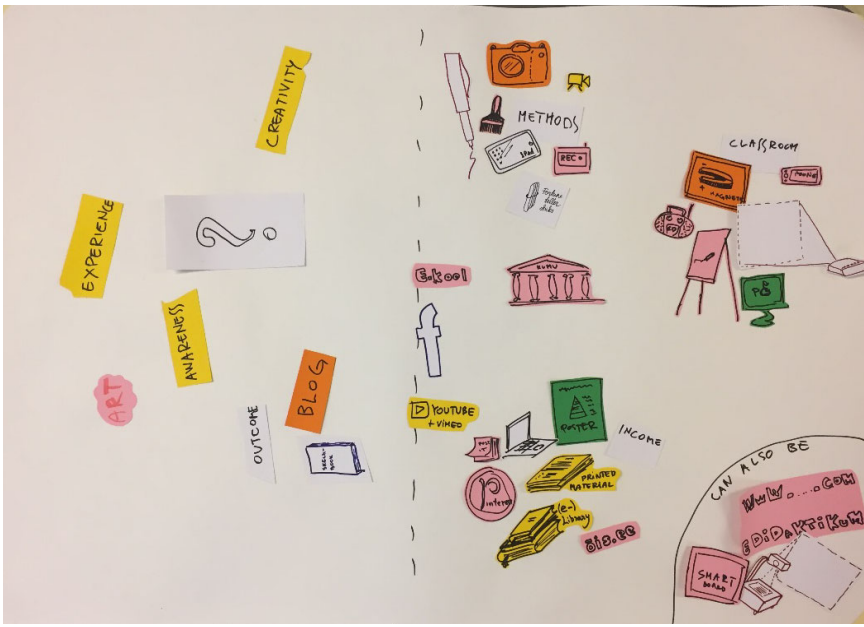


Figure 23. Map from workshop (wsE1)

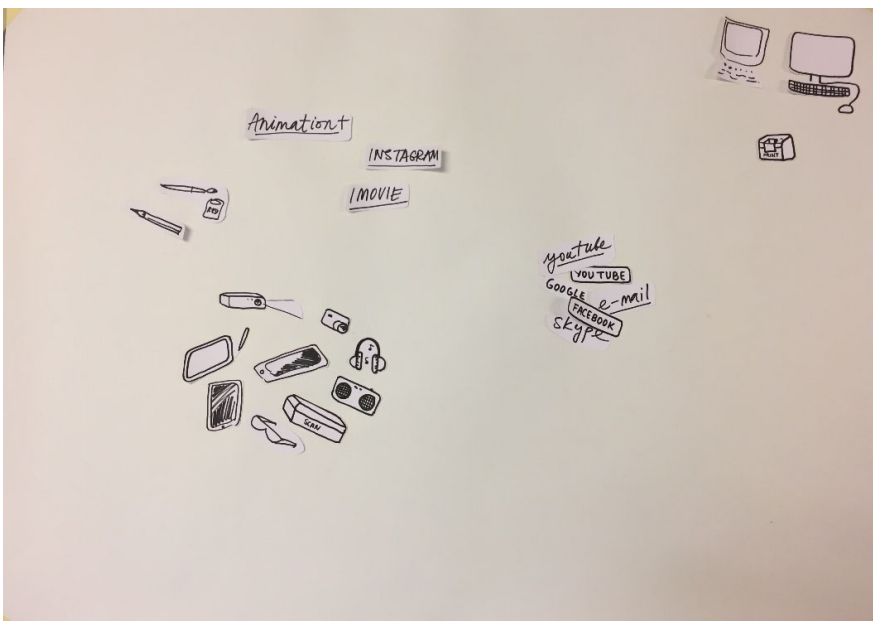


Figure 24. Map from workshop (wsE2)

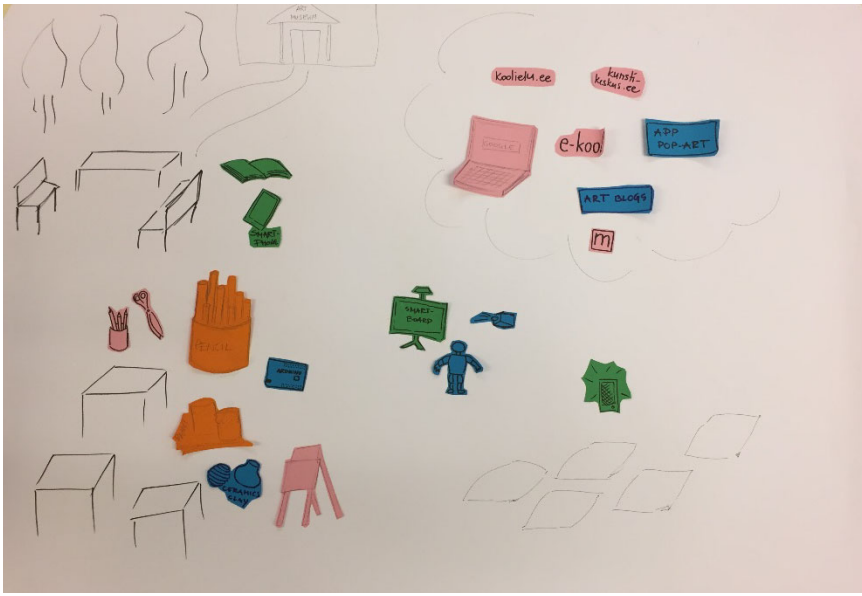


Figure 25. Map from workshop (wsE3)

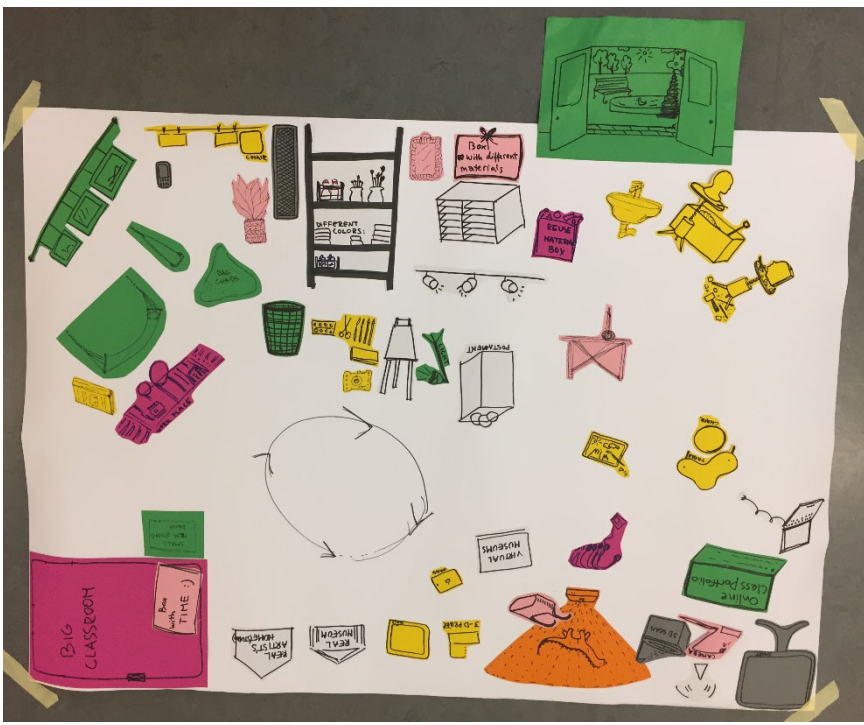


Figure 26. Map from workshop (wsE4)

Södertörn Doctoral Dissertations

1. Jolanta Aidukaite, *The Emergence of the Post-Socialist Welfare State: The case of the Baltic States: Estonia, Latvia and Lithuania*, 2004
2. Xavier Fraudet, *Politique étrangère française en mer Baltique (1871–1914): de l'exclusion à l'affirmation*, 2005
3. Piotr Wawrzeniuk, *Confessional Civilising in Ukraine: The Bishop Iosyf Shumliansky and the Introduction of Reforms in the Diocese of Lviv 1668–1708*, 2005
4. Andrej Kotljarchuk, *In the Shadows of Poland and Russia: The Grand Duchy of Lithuania and Sweden in the European Crisis of the mid-17th Century*, 2006
5. Håkan Blomqvist, *Nation, ras och civilisation i svensk arbetarrörelse före nazismen*, 2006
6. Karin S Lindelöf, *Om vi nu ska bli som Europa: Könsskapande och normalitet bland unga kvinnor i transitionens Polen*, 2006
7. Andrew Stickley. *On Interpersonal Violence in Russia in the Present and the Past: A Sociological Study*, 2006
8. Arne Ek, *Att konstruera en uppslutning kring den enda vägen: Om folkrörelsers modernisering i skuggan av det Österuropeiska systemskiftet*, 2006
9. Agnes Ers, *I mänsklighetens namn: En etnologisk studie av ett svenskt biståndsprojekt i Rumänien*, 2006
10. Johnny Rodin, *Rethinking Russian Federalism: The Politics of Intergovernmental Relations and Federal Reforms at the Turn of the Millennium*, 2006
11. Kristian Petrov, *Tillbaka till framtiden: Modernitet, postmodernitet och generationsidentitet i Gorbačevs glasnost' och perestrojka*, 2006
12. Sophie Söderholm Werkö, *Patient patients? Achieving Patient Empowerment through Active Participation, Increased Knowledge and Organisation*, 2008
13. Peter Bötker, *Leviatan i arkipelagen: Staten, förvaltningen och samhället. Fallet Estland*, 2007
14. Matilda Dahl, *States under scrutiny: International organizations, transformation and the construction of progress*, 2007
15. Margrethe B. Søvik, *Support, resistance and pragmatism: An examination of motivation in language policy in Kharkiv*, Ukraine, 2007
16. Yulia Gradskova, *Soviet People with female Bodies: Performing beauty and maternity in Soviet Russia in the mid 1930–1960s*, 2007

17. Renata Ingbrant, *From Her Point of View: Woman's Anti-World in the Poetry of Anna Świrszczyńska*, 2007
18. Johan Eellend, *Cultivating the Rural Citizen: Modernity, Agrarianism and Citizenship in Late Tsarist Estonia*, 2007
19. Petra Garberding, *Musik och politik i skuggan av nazismen: Kurt Atterberg och de svensk-tyska musikrelationerna*, 2007
20. Aleksei Semenenko, *Hamlet the Sign: Russian Translations of Hamlet and Literary Canon Formation*, 2007
21. Vytautas Petronis, *Constructing Lithuania: Ethnic Mapping in the Tsarist Russia, ca. 1800–1914*, 2007
22. Akvile Motiejunaite, *Female employment, gender roles, and attitudes: the Baltic countries in a broader context*, 2008
23. Tove Lindén, *Explaining Civil Society Core Activism in Post-Soviet Latvia*, 2008
24. Pelle Åberg, *Translating Popular Education: Civil Society Cooperation between Sweden and Estonia*, 2008
25. Anders Nordström, *The Interactive Dynamics of Regulation: Exploring the Council of Europe's monitoring of Ukraine*, 2008
26. Fredrik Doeser, *In Search of Security After the Collapse of the Soviet Union: Foreign Policy Change in Denmark, Finland and Sweden, 1988–1993*, 2008
27. Zhanna Kravchenko. *Family (versus) Policy: Combining Work and Care in Russia and Sweden*, 2008
28. Rein Jüriado, *Learning within and between public-private partnerships*, 2008
29. Elin Boalt, *Ecology and evolution of tolerance in two cruciferous species*, 2008
30. Lars Forsberg, *Genetic Aspects of Sexual Selection and Mate Choice in Salmonids*, 2008
31. Eglė Rindzevičiūtė, *Constructing Soviet Cultural Policy: Cybernetics and Governance in Lithuania after World War II*, 2008
32. Joakim Philipson, *The Purpose of Evolution: 'struggle for existence' in the Russian-Jewish press 1860–1900*, 2008
33. Sofie Bedford, *Islamic activism in Azerbaijan: Repression and mobilization in a post-Soviet context*, 2009
34. Tommy Larsson Segerlind, *Team Entrepreneurship: A process analysis of the venture team and the venture team roles in relation to the innovation process*, 2009
35. Jenny Svensson, *The Regulation of Rule-Following: Imitation and Soft Regulation in the European Union*, 2009
36. Stefan Hallgren, *Brain Aromatase in the guppy, Poecilia reticulate: Distribution, control and role in behavior*, 2009
37. Karin Ellencrona, *Functional characterization of interactions between the flavivirus NS5 protein and PDZ proteins of the mammalian host,* 2009

38. Makiko Kanematsu, *Saga och verklighet: Barnboksproduktion i det postsovjetiska Lettland,* 2009
39. Daniel Lindvall, *The Limits of the European Vision in Bosnia and Herzegovina: An Analysis of the Police Reform Negotiations,* 2009
40. Charlotta Hillerdal, *People in Between – Ethnicity and Material Identity: A New Approach to Deconstructed Concepts*, 2009
41. Jonna Bornemark, *Kunskapens gräns – gränsens vetande,* 2009
42. Adolphine G. Kateka, *Co-Management Challenges in the Lake Victoria Fisheries: A Context Approach*, 2010
43. René León Rosales, *Vid framtidens hitersta gräns: Om pojkar och elevpositioner i en multietnisk skola*, 2010
44. Simon Larsson, *Intelligensaristokrater och arkivmartyrer: Normerna för vetenskaplig skicklighet i svensk historieforskning 1900–1945*, 2010
45. Håkan Lättman, *Studies on spatial and temporal distributions of epiphytic lichens*, 2010
46. Alia Jaensson, *Pheromonal mediated behaviour and endocrine response in salmonids: The impact of cypermethrin, copper, and glyphosate*, 2010
47. Michael Wigerius, *Roles of mammalian Scribble in polarity signaling, virus offense and cell-fate determination,* 2010
48. Anna Hedtjärn Wester, *Män i kostym: Prinsar, konstnärer och tegelbärare vid sekelskiftet 1900*, 2010
49. Magnus Linnarsson, *Postgång på växlande villkor: Det svenska postväsendets organisation under stormaktstiden*, 2010
50. Barbara Kunz, *Kind words, cruise missiles and everything in between: A neoclassical realist study of the use of power resources in U.S. policies towards Poland, Ukraine and Belarus 1989–2008*, 2010
51. Anders Bartonek, *Philosophie im Konjunktiv: Nichtidentität als Ort der Möglichkeit des Utopischen in der negativen Dialektik Theodor W. Adornos,* 2010
52. Carl Cederberg, *Resaying the Human: Levinas Beyond Humanism and Antihumanism*, 2010
53. Johanna Ringarp, *Professionens problematik: Lärarkårens kommunalisering och välfärdsstatens förvandling*, 2011
54. Sofi Gerber, *Öst är Väst men Väst är bäst: Östtysk identitetsformering i det förenade Tyskland*, 2011
55. Susanna Sjödin Lindenskoug, *Manlighetens bortre gräns: Tidelagsrättegångar i Livland åren 1685–1709*, 2011
56. Dominika Polanska, *The emergence of enclaves of wealth and poverty: A sociological study of residential differentiation in post-communist Poland*, 2011
57. Christina Douglas, *Kärlek per korrespondens: Två förlovade par under andra hälften av 1800-talet*, 2011

58. Fred Saunders, *The Politics of People – Not just Mangroves and Monkeys: A study of the theory and practice of community-based management of natural resources in Zanzibar*, 2011
59. Anna Rosengren, *Åldrandet och språket: En språkhistorisk analys av hög ålder och åldrande i Sverige cirka 1875–1975*, 2011
60. Emelie Lilliefeldt, *European Party Politics and Gender: Configuring Gender-Balanced Parliamentary Presence*, 2011
61. Ola Svenonius, *Sensitising Urban Transport Security: Surveillance and Policing in Berlin, Stockholm, and Warsaw*, 2011
62. Andreas Johansson, *Dissenting Democrats: Nation and Democracy in the Republic of Moldova*, 2011
63. Wessam Melik, *Molecular characterization of the Tick-borne encephalitis virus: Environments and replication*, 2012
64. Steffen Werther, *SS-Vision und Grenzland-Realität: Vom Umgang dänischer und „volksdeutscher" Nationalsozialisten in Sønderjylland mit der „großgermanischen" Ideologie der SS*, 2012
65. Peter Jakobsson, *Öppenhetsindustrin*, 2012
66. Kristin Ilves, *Seaward Landward: Investigations on the archaeological source value of the landing site category in the Baltic Sea region*, 2012
67. Anne Kaun, *Civic Experiences and Public Connection: Media and Young People in Estonia*, 2012
68. Anna Tessmann, *On the Good Faith: A Fourfold Discursive Construction of Zoroastripanism in Contemporary Russia*, 2012
69. Jonas Lindström, *Drömmen om den nya staden: stadsförnyelse i det postsovjetisk Riga,* 2012
70. Maria Wolrath Söderberg, *Topos som meningsskapare: retorikens topiska perspektiv på tänkande och lärande genom argumentation*, 2012
71. Linus Andersson, *Alternativ television: former av kritik i konstnärlig TV-produktion,* 2012
72. Håkan Lättman, *Studies on spatial and temporal distributions of epiphytic lichens*, 2012
73. Fredrik Stiernstedt, Mediearbete i mediehuset: produktion i förändring på MTG-radio, 2013
74. Jessica Moberg, *Piety, Intimacy and Mobility: A Case Study of Charismatic Christianity in Present-day Stockholm*, 2013
75. Elisabeth Hemby, *Historiemåleri och bilder av vardag: Tatjana Nazarenkos konstnärskap i 1970-talets Sovjet*, 2013
76. Tanya Jukkala, *Suicide in Russia: A macro-sociological study*, 2013
77. Maria Nyman, *Resandets gränser: svenska resenärers skildringar av Ryssland under 1700-talet*, 2013

78. Beate Feldmann Eellend, *Visionära planer och vardagliga praktiker: postmilitära landskap i Östersjöområdet,* 2013
79. Emma Lind, *Genetic response to pollution in sticklebacks: natural selection in the wild*, 2013
80. Anne Ross Solberg, *The Mahdi wears Armani: An analysis of the Harun Yahya enterprise,* 2013
81. Nikolay Zakharov, *Attaining Whiteness: A Sociological Study of Race and Racialization in Russia,* 2013
82. Anna Kharkina, *From Kinship to Global Brand: the Discourse on Culture in Nordic Co-operation after World War II*, 2013
83. Florence Fröhlig, *A painful legacy of World War II: Nazi forced enlistment: Alsatian/Mosellan Prisoners of war and the Soviet Prison Camp of Tambov*, 2013
84. Oskar Henriksson, *Genetic connectivity of fish in the Western Indian Ocean*, 2013
85. Hans Geir Aasmundsen, *Pentecostalism, Globalisation and Society in Contemporary Argentina*, 2013
86. Anna McWilliams, *An Archaeology of the Iron Curtain: Material and Metaphor*, 2013
87. Anna Danielsson, *On the power of informal economies and the informal economies of power: rethinking informality, resilience and violence in Kosovo*, 2014
88. Carina Guyard, *Kommunikationsarbete på distans*, 2014
89. Sofia Norling, *Mot "väst": om vetenskap, politik och transformation i Polen 1989–2011*, 2014
90. Markus Huss, *Motståndets akustik: språk och (o)ljud hos Peter Weiss 1946–1960,* 2014
91. Ann-Christin Randahl, *Strategiska skribenter: skrivprocesser i fysik och svenska*, 2014
92. Péter Balogh, *Perpetual borders: German-Polish cross-border contacts in the Szczecin area*, 2014
93. Erika Lundell, *Förkroppsligad fiktion och fiktionaliserade kroppar: levande rollspel i Östersjöregionen*, 2014
94. Henriette Cederlöf, *Alien Places in Late Soviet Science Fiction: The "Unexpected Encounters" of Arkady and Boris Strugatsky as Novels and Films*, 2014
95. Niklas Eriksson, *Urbanism Under Sail: An archaeology of fluit ships in early modern everyday life*, 2014
96. Signe Opermann, *Generational Use of News Media in Estonia: Media Access, Spatial Orientations and Discursive Characteristics of the News Media*, 2014
97. Liudmila Voronova, *Gendering in political journalism: A comparative study of Russia and Sweden,* 2014
98. Ekaterina Kalinina, *Mediated Post-Soviet Nostalgia*, 2014

99. Anders E. B. Blomqvist, *Economic Natonalizing in the Ethnic Borderlands of Hungary and Romania: Inclusion, Exclusion and Annihilation in Szatmár/Satu-Mare, 1867–1944,* 2014
100. Ann-Judith Rabenschlag, *Völkerfreundschaft nach Bedarf: Ausländische Arbeitskräfte in der Wahrnehmung von Staat und Bevölkerung der DDR*, 2014
101. Yuliya Yurchuck, *Ukrainian Nationalists and the Ukrainian Insurgent Army in Post-Soviet Ukraine*, 2014
102. Hanna Sofia Rehnberg, *Organisationer berättar: narrativitet som resurs i strategisk kommunikation*, 2014
103. Jaakko Turunen, *Semiotics of Politics: Dialogicality of Parliamentary Talk*, 2015
104. Iveta Jurkane-Hobein, *I Imagine You Here Now: Relationship Maintenance Strategies in Long-Distance Intimate Relationships*, 2015
105. Katharina Wesolowski*, Maybe baby? Reproductive behaviour, fertility intentions, and family policies in post-communist countries, with a special focus on Ukraine*, 2015
106. Ann af Burén, *Living Simultaneity: On religion among semi-secular Swedes*, 2015
107. Larissa Mickwitz, *En reformerad lärare: konstruktionen av en professionell och betygssättande lärare i skolpolitik och skolpraktik,* 2015
108. Daniel Wojahn, *Språkaktivism: diskussioner om feministiska språkförändringar i Sverige från 1960-talet till 2015*, 2015
109. Hélène Edberg, *Kreativt skrivande för kritiskt tänkande: en fallstudie av studenters arbete med kritisk metareflektion*, 2015
110. Kristina Volkova, *Fishy Behavior: Persistent effects of early-life exposure to 17α-ethinylestradiol*, 2015
111. Björn Sjöstrand, *Att tänka det tekniska: en studie i Derridas teknikfilosofi,* 2015
112. Håkan Forsberg, *Kampen om eleverna: gymnasiefältet och skolmarknadens framväxt i Stockholm, 1987–2011*, 2015
113. Johan Stake, *Essays on quality evaluation and bidding behavior in public procurement auctions*, 2015
114. Martin Gunnarson, *Please Be Patient: A Cultural Phenomenological Study of Haemodialysis and Kidney Transplantation Care*, 2016
115. Nasim Reyhanian Caspillo, *Studies of alterations in behavior and fertility in ethinyl estradiol-exposed zebrafish and search for related biomarkers,* 2016
116. Pernilla Andersson, *The Responsible Business Person: Studies of Business Education for Sustainability,* 2016
117. Kim Silow Kallenberg, *Gränsland: svensk ungdomsvård mellan vård och straff,* 2016
118. Sari Vuorenpää, *Literacitet genom interaction*, 2016
119. Francesco Zavatti, *Writing History in a Propaganda Institute: Political Power and Network Dynamics in Communist Romania*, 2016

120. Cecilia Annell, *Begärets politiska potential: Feministiska motståndsstrategier i Elin Wägners 'Pennskaftet', Gabriele Reuters 'Aus guter Familie', Hilma Angered-Strandbergs 'Lydia Vik' och Grete Meisel-Hess 'Die Intellektuellen'*, 2016
121. Marco Nase, *Academics and Politics: Northern European Area Studies at Greifswald University, 1917–1992,* 2016
122. Jenni Rinne, *Searching for Authentic Living Through Native Faith – The Maausk movement in Estonia*, 2016
123. Petra Werner, *Ett medialt museum: lärandets estetik i svensk television 1956–1969*, 2016
124. Ramona Rat, *Un-common Sociality: Thinking sociality with Levinas*, 2016
125. Petter Thureborn, *Microbial ecosystem functions along the steep oxygen gradient of the Landsort Deep, Baltic Sea*, 2016
126. Kajsa-Stina Benulic, *A Beef with Meat Media and audience framings of environmentally unsustainable production and consumption*, 2016
127. Naveed Asghar, *Ticks and Tick-borne Encephalitis Virus – From nature to infection*, 2016
128. Linn Rabe, *Participation and legitimacy: Actor involvement for nature conservation*, 2017
129. Maryam Adjam, *Minnesspår: hågkomstens rum och rörelse i skuggan av en flykt*, 2017
130. Kim West, *The Exhibitionary Complex: Exhibition, Apparatus and Media from Kulturhuset to the Centre Pompidou, 1963–1977*, 2017
131. Ekaterina Tarasova, *Anti-nuclear Movements in Discursive and Political Contexts: Between expert voices and local protests, 2017*
132. Sanja Obrenović Johansson, *Från kombifeminism till rörelse: Kvinnlig serbisk organisering i förändring, 2017*
133. Michał Salamonik, *In Their Majesties' Service: The Career of Francesco De Gratta (1613–1676) as a Royal Servant and Trader in Gdańsk,* 2017
134. Jenny Ingridsdotter, *The Promises of the Free World: Postsocialist Experience in Argentina and the Making of Migrants, Race, and Coloniality*, 2017
135. Julia Malitska, *Negotiating Imperial Rule: Colonists and Marriage in the Nineteenth century Black Sea Steppe,* 2017
136. Natalya Yakusheva, *Parks, Policies and People: Nature Conservation Governance in Post-Socialist EU Countries,* 2017
137. Martin Kellner, *Selective Serotonin Re-uptake Inhibitors in the Environment: Effects of Citalopram on Fish Behaviour,* 2017
138. Krystof Kasprzak, *Vara – Framträdande – Värld: Fenomenets negativitet hos Martin Heidegger, Jan Patočka och Eugen Fink*, 2017
139. Alberto Frigo, *Life-stowing from a Digital Media Perspective: Past, Present and Future*, 2017
140. Maarja Saar, *The Answers You Seek Will Never Be Found at Home: Reflexivity, biographical narratives and lifestyle migration among highly-skilled Estonians*, 2017

141. Anh Mai, *Organizing for Efficiency: Essay on merger policies, independence of authorities, and technology diffusion*, 2017
142. Gustav Strandberg, *Politikens omskakning: Negativitet, samexistens och frihet i Jan Patočkas tänkande*, 2017
143. Lovisa Andén, *Litteratur och erfarenhet i Merleau-Pontys läsning av Proust, Valéry och Stendhal*, 2017
144. Fredrik Bertilsson, *Frihetstida policyskapande: uppfostringskommissionen och de akademiska konstitutionerna 1738–1766*, 2017
145. Börjeson, Natasja, *Toxic Textiles – towards responsibility in complex supply chains*, 2017
146. Julia Velkova, *Media Technologies in the Making – User-Driven Software and Infrastructures for computer Graphics Production*, 2017
147. Karin Jonsson, *Fångna i begreppen? Revolution, tid och politik i svensk socialistisk press 1917–1924*, 2017
148. Josefine Larsson, *Genetic Aspects of Environmental Disturbances in Marine Ecosystems – Studies of the Blue Mussel in the Baltic Sea*, 2017
149. Roman Horbyk, *Mediated Europes – Discourse and Power in Ukraine, Russia and Poland during Euromaidan*, 2017
150. Nadezda Petrusenko, *Creating the Revolutionary Heroines: The Case of Female Terrorists of the PSR (Russia, Beginning of the 20th Century)*, 2017
151. Rahel Kuflu, *Bröder emellan: Identitetsformering i det koloniserade Eritrea*, 2018
152. Karin Edberg, *Energilandskap i förändring: Inramningar av kontroversiella lokaliseringar på norra Gotland*, 2018
153. Rebecka Thor, *Beyond the Witness: Holocaust Representation and the Testimony of Images - Three films by Yael Hersonski, Harun Farocki, and Eyal Sivan*, 2018
154. Maria Lönn, *Bruten vithet: Om den ryska femininitetens sinnliga och temporala villkor*, 2018
155. Tove Porseryd, *Endocrine Disruption in Fish: Effects of 17α-ethinylestradiol exposure on non-reproductive behavior, fertility and brain and testis transcriptome*, 2018
156. Marcel Mangold, *Securing the working democracy: Inventive arrangements to guarantee circulation and the emergence of democracy policy*, 2018
157. Matilda Tudor, *Desire Lines: Towards a Queer Digital Media Phenomenology*, 2018
158. Martin Andersson, *Migration i 1600-talets Sverige: Älvsborgs lösen 1613–1618*, 2018
159. Johanna Pettersson, *What's in a Line? Making Sovereignty through Border Policy*, 2018
160. Irina Seits, *Architectures of Life-Building in the Twentieth Century: Russia, Germany, Sweden*, 2018
161. Alexander Stagnell, *The Ambassador's Letter: On the Less Than Nothing of Diplomacy*, 2019
162. Mari Zetterqvist Blokhuis, *Interaction Between Rider, Horse and Equestrian Trainer – A Challenging Puzzle*, 2019
163. Robin Samuelsson, *Play, Culture and Learning: Studies of Second-Language and Conceptual Development in Swedish Preschools*, 2019

164. Ralph Tafon, *Analyzing the "Dark Side" of Marine Spatial Planning – A study of domination, empowerment and freedom (or power* in, of *and* on *planning) through theories of discourse and power*, 2019
165. Ingela Visuri, *Varieties of Supernatural Experience: The case of high-functioning autism*, 2019
166. Mathilde Rehnlund, *Getting the transport right – for what? What transport policy can tell us about the construction of sustainability*, 2019
167. Oscar Törnqvist, *Röster från ingenmansland: En identitetsarkeologi i ett maritimt mellanrum*, 2019
168. Elise Remling, *Adaptation, now? Exploring the Politics of Climate Adaptation through Post-structuralist Discourse Theory*, 2019
169. Eva Karlberg, *Organizing the Voice of Women: A study of the Polish and Swedish women's movements' adaptation to international structures*, 2019
170. Maria Pröckl, *Tyngd, sväng och empatisk timing: Förskollärares kroppsliga kunskaper*, 2020.
171. Adriá Alcoverro, *The university and the demand for knowledge-based growth: The hegemonic struggle for the future of Higher Education Institutions in Finland and Estonia*, 2020
172. Ingrid Forsler, *Enabling Media: Infrastructures, imaginaries and cultural techniques in Swedish and Estonian visual arts education*, 2020

In an increasingly mediatized society, the ability to understand and communicate through media becomes more important than ever. Visual arts education, as a school subject that has been defined and reshaped historically in relation to different media technologies for image making, can be considered one place to develop such media literacy. Art educators are central actors in this process as they handle and navigate media environments consisting of material, technologies, techniques and soft infrastructures from different time periods and traditions. This dissertation explores the relation between media, education and teachers by comparing how art educators in Sweden and Estonia relate to media in their subject, showing that local media environments *enable* certain traditions and ideas about education, at the same time as these environments are *enabled* through the work of educators. It further suggests that a broad definition of media as enabling environments can be used to develop the field of media literacy and promotes a turn towards *infrastructure literacy* in visual arts education.

Media and Communication Studies, Critical and Cultural Theory, School of Culture and Education & Baltic and East European Graduate School, Södertörn University.

ISBN 978-91-89109-04-9 (print) / 978-91-89109-05-6 (digital) | **Södertörn University** | **publications@sh.se**

SÖDERTÖRN UNIVERSITY | STOCKHOLM
sh.se