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Adequate Digital Competence: Exploring Revisions in the Swedish National Curriculum

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This article explores how digital competence is conceptualized in recent revisions in the curriculum for Swedish compulsory school, based on nine-year long schooling from age 7 to 16. Four themes are identified based on a thematic content analysis of the revisions in the subject descriptions: use of digital tools and media, programming, critical awareness and responsibility. The distribution of the thematic revisions differs among the subjects, but the most dominating theme, permeating all the subjects, concerns the tool-oriented use of digital tools and media. This strong dominance of the operational perspective tends to narrow the conceptualization compared to international definitions and frameworks of digital competence.

Keywords: curriculum change, digitization, digitalization, digital competence

1. Introduction

Questions of how compulsory school can prepare students for citizenship in a digitalized society are currently on the agenda in many countries around the world. In 2006, the EU commission included digital competence in the framework of key competencies for all citizens (European Parliament, 2006) and since then digital competence has become a core concept in policy making, educational research, school development, and teacher training. However, the meaning of the concept of digital competence has diverse connotations in different contexts which is highly negotiable and in need of interpretation in actual educational practice (Spante, Sofkova Hashemi, Lundin & Algers 2018; Søby, 2008). At stake in such negotiations and interpretations are not only details of what specific skills are to be taught in schools, but also, on a deeper level, the question of what knowledge and competences the citizens of tomorrow will need and are entitled to. Questions of what is included in curricula involve a normative selection and framing of what knowledge is seen as important for future generations to know (Deng & Luke, 2008).

Currently, in Sweden, *digital competence* is used as a foundational concept in the national strategy for the digitalization of education (Ministry of Education, 2017). Envisioning digital competence as a democracy issue and school as the place where we learn to understand the world, the Ministry of Education states that:

> All children and students need to understand how digitalization affects the world and our lives, how programming controls both the flow of information we get and the tools we use, as well as gaining knowledge of how technology works to apply it (Ministry of Education, 2017, p. 3).

The overall aim of the national strategy is to give students the opportunity to develop the ability to use and create with digital technology and understand how digitization affects the individual and society. Three areas are in particular focus: *Digital competence for all in the school system, Equal access and use, Research and evaluation of the possibilities of digitalization*. To reach the goal of digital competence for all, digital equity within the school system is a prerequisite in order to allow all children and students the opportunity to develop "adequate digital competence*"* throughout their schooling. Moreover, students need to have equal access to digital tools, school leaders need to be able to strategically lead the digital development and all personnel needs to have the competence to choose digital tools and appropriately use them (Ministry of Education, 2017, p. 6).

Aligning with the goal of the national strategy, revisions have been done in the national curriculum for the compulsory school[1], with the aim to strengthen students' digital competence. Additions and alterations have been made in the aim and core content of several subjects. These revisions, implemented in July 2018, are by the government accentuated to concern specific areas. One such area is *programming*, which is introduced throughout compulsory school. The other areas are: *students' ability to critically evaluate sources, students' understanding of digital systems and services, the impact of digitization on society, working with digital texts, media and tools, and being able to solve problems and translate ideas into action in a creative manner using digital technology* (Swedish Government, 2017, p. 1).

The conceptualization of digital competence, based on the recent revisions in the national curricula for compulsory school in Sweden, is the object of study in this article. Our goal is to explore in what ways digital competence is approached and defined in the revisions and thus contribute to an understanding of what this curriculum revision indicates to be recognized as knowledge and competences needed to prepare future citizens for life and work in a digitalised society. We particularly investigate the following questions:

- How is digital competence conceptualized in the fundamental values and goals of the revised curricula and the syllabi of subjects?
- How do the conceptualizations of digital competence in the Swedish curricula relate to conceptualizations and definitions of digital competence at an international level?

The following sections entail a literature review, relating to both research and policy on how to define digital competence in school settings and curricular revisions in Sweden.

1.1 Defining digital competence

The definition of *digital competence* put forward by the EU (European Commission, 2006) as one of the key competencies for lifelong learning has been influential in educational policy documents. Ala-Mutka (2011) states that this original practice-oriented definition of digital competence as "the ability to apply knowledge and skills to different contexts, such as work, leisure, or learning" (p. 18) has developed towards a broadening of the concept, combining technical, cognitive and socio-cultural aspects of learning (e.g. Ferrari, 2013; European commission, 2017; Broadband Commission, 2017). Changes in the definition of digital competence has moved from a solely operational and technical "know-how" focus on technology use, towards the inclusion of knowledge-oriented cognitive, critical and responsible

1 At the time of the revisions, compulsory school in Sweden was nine years. In august 2018, the preschool class became compulsory which means that compulsory school in Sweden today is ten years, starting at the age of 6. However, since the preschool class was not compulsory at the time of the revisions, it is not included in the analysis.

perspectives on society (e.g. Buckingham, 2007, 2015; European Commission, 2017; Iordache, Mariën, & Baelden , 2017; Spante et al., 2018).

Recently, the EU presented an updated version of the definition, DigComp 2.1 (European Commission, 2017), with five competence areas: information and data literacy, digital communication and collaboration, creating digital content, digital safety and digital rights (p. 28-30). Whereas the Broadband commission defines the areas part of DigComp 2.1 as recurring in other definitions, they see competences as either generic basic functional skills or complementary higher-level skills. Higher-level skills, such as programming skills, critical thinking, creativity, and innovation, tend to be seen as complementary skills, while generic functional skills such as access to digital technology and a basic understanding of how technology works, are considered basic skills (OECD, 2016). In the European framework, DigComp 2.1 each competence area has different proficiency levels and is therefore not rated as basic, generic or higher level (European Commission, 2017).

The Swedish national strategy for the digitalization of the educational system (Ministry of Education, 2017) refers to the definition of digital competence stated by the Swedish Commission for digitalization: "Digital competence constitutes the extent to which one is familiar with digital tools and services, and has the ability to monitor digital development and its impact on one's life" (SOU 2015:28, p. 102). The Swedish Commission for digitalization also states that digital competence includes: knowledge of how to search for information, communicate, interact and produce digitally, skills to use digital tools and services, understanding the transformation involved in the digitalization of society with its possibilities and risks, and motivation to participate in the development. This is in line with how digital competence is addressed by the Swedish National Agency of Education (2017b) which further distinguishes four aspects of digital competence on which the current curriculum is based: *understanding how digitalization affects society, using and understanding digital tools and media, applying a critical and responsible approach towards digital technology, and solving problems and applying ideas creatively by using digital technology*.

A recent study exploring concept use in Nordic curricula reveals a Nordic perspective emphasising the importance of developing digital 'bildung' as a broad knowledge area including societal and critical aspects of living and working (Godhe, 2019). In another study of Nordic curricula and research, Elf, Gilje, Olin-Scheller and Slotte (2018) study the concept of multimodality in mother tongue subjects and concludes that multimodality is closely linked to the use of digital technology. Since digital tools facilitate the creation of multimodal texts this has become an everyday practice for many when creating messages using both texts, images and perhaps sound. Elf et al. (2018) discern a move from reception to production of multimodal texts in the knowledge requirements in the curricula and argue that this calls for qualitative aspects of multimodal productions to be formulated in curricula. Similar to previous findings, educational

practices and teaching on multimodality is, however, closely connected to the operational aspects and use of digital technology (Elf et al., 2018).

1.2 Curriculum revisions in Sweden

A basic question in curricula studies is what counts as knowledge in schools (Englund, Forsberg & Sundberg, 2012; Deng & Luke, 2008). The revision of the curricula and the introduction of digital competence, as something which students should have the opportunity to develop during their school years, denote what counts as knowledge in the educational system.

According to Englund (2012), the Swedish school system has undergone three phases of curriculum revisions. The system has moved from *centralisation* focusing on equity and schools where all students, regardless of differences in social, cultural and knowledge capital, met and learned together, to *decentralisation* connected to the freedom of choice and parents' right to choose schools for their children and then towards *recentralisation* with a rapid expansion of private schools run by large corporate businesses and increased importance of national tests and school inspections. In this changed view on education for "the private good" rather than for "the public good" the concept of competence constitutes a central political term and an instrument for the recentralisation of education (Englund, 2012). Education is increasingly conceptualized in terms of qualifications and the effectiveness of the education system through transnational policies (Nordin & Sundberg, 2018).

Nordin and Sundberg (2016), as well as Lilliedal and Rapp (2018), argue that European transnational discourse focuses on basic skills as well as generic, or transversal, skills, including digital competence, learning to learn and cultural awareness. Whereas Sweden converges with the European discourse when it comes to conceptualizing basic skills and knowledge, the Swedish curricula diverge when it comes to generic skills since the classification between subjects is stronger than the framing of competencies. The Swedish curricula take its standpoint in the school subjects whereas generic skills are not as prominent even though cultural awareness, for example, is detectable in the overall goals stated in the first two chapters of the curricula. However, the curriculum revision aiming at strengthening digital competence may be seen as a move towards these generic skills since it also introduces the concept of competence in the curricula. This can be compared to the neighbouring country Norway, where digital competence was introduced as a core competence already in 2006, on par with literacy and numeracy.

As the literature review reveals, digital competence has evolved to include other aspects than merely the knowledge of handling and mastering digital technology and tools with several diverse views and definitions rather than a singular commonly accepted definition. How the revisions in the Swedish curricula adheres to this will be investigated in the following.

2. Material and methods

Revisions in the curricula for compulsory school to strengthen digital competence form the source of analysis in this study, as well as related documents, such as official comments on syllabi (Swedish National Agency of Education, 2017a, 2017b). The curriculum is divided into five chapters: chapter one and two concern fundamental values and goals, applicable to all years, chapter three and four are directed towards preschool classes and leisure centers and chapter five contains the syllabus for all subjects.

Each syllabus outlines the aim of the subject, core content and the knowledge requirements based on the abilities the students should develop within the subject. According to Jönsson (2015), the Swedish curricula combine content and performance-based standards in the subject syllabi since the core content refers to content standards and the knowledge requirements to performance-based standards. While content standards focus on content knowledge and what the student knows, performance standards define different levels of know-how and what students can do with their knowledge (Jönsson, 2015). The content-based standards are described in the core content in each subject, in relation to school years, thereby defining progression within the subject. The knowledge requirements refer to performance standards and levels of performance are described in student profiles outlining the qualities that should be noticeable in the performance of students at different levels. For example, in the syllabi of English, the knowledge requirements for students at the end of year 6, one of the requirements is described in the following way for the grades E, C, and A (where A is the highest grade and E the lowest grade for passing);

- Grade E – Pupils can understand **the most essential content** in clearly spoken, simple English at a relaxed pace in simple texts about daily and familiar topics.
- Grade C - Pupils can understand **the main content and clear details** in simple English, clearly spoken at a relaxed pace, and also in simple texts on daily and familiar topics.
- Grade A - Pupils can understand **both the whole and the details** in English spoken at a moderate pace in ordinary texts in various genres.

The words in bold denote the performance level at each level and it is also shown in the type of texts described at the end of the sentences. The performance-based knowledge requirements form the basis for assessment rather than the content-based standards and how well the students can reproduce the core content. Based on the performance standards outlined in the knowledge requirements, the students are expected to show how they can use the content knowledge to, for example, explain, describe and reason, and the content thereby forms the basis for the performance standards. Tensions between the different kinds of standards that are present in the syllabi has been debated amongst teachers as well as in

newspapers and by politicians in Sweden. However, since this is not the major topic of this article, we will point out these differences but refrain from further discussing them in detail. Moreover, no revisions have been made in the knowledge requirements when digital competence was written into the curricula, a fact that will be further discussed in the last section of this article.

When analysing the revisions in the curriculum, we employed an inductive approach along with thematic content analysis to draw conclusions on topics and themes that are recurrent in the revisions (Boyatis, 1998; Braun & Clarke, 2006). This qualitative technique to analyse our data involved an iterative process of reading and extracting the revisions, identifying revisions in the form of additions, substitutions, and deletions, assigning codes and finally, determining patterns in the material. The codes were identified independently by each researcher and categorized according to the implications. The coding categories, which had a high degree of agreement between the coders, were then discussed and sorted into the themes. We also made quantification of the established themes in order to be able to visualize the ratio between the themes, in the curricula as a whole and between subjects.

3. Analysis of curriculum revisions

In this section, we first address the conceptualisations of digital competence in the revisions made in chapters one and two, dealing with fundamental values and goals, and then in the subjects' syllabi (Swedish National Agency of Education, 2017a). These findings will be further analysed in relation to international conceptions of digital competence and discussed in the concluding section.

Revisions in the introductory section pay attention to the effects of digitalization on a societal level, addressing ethical and moral issues such as the responsibilities that teachers and headmasters have to assure that all students get the opportunity to develop an understanding of these societal issues. In the part that concerns the overall goal of school, the increasing pace and amount of information in society is recognized, like in earlier versions of the curricula. However, there is now an additional formulation that concerns the ability for students to act in a complex reality and to critically review information. Moreover, possibilities and risks caused by increased digitalization are acknowledged as part of working with norms and rules and as something that everyone working in school need to address. That these aspects are part of the concept of digital competence is explicitly stated in the following quote:

> The school should contribute to the students developing an understanding of how digitization affects the individual and society's development. All students should be given the opportunity to develop their ability to use digital technology. They should also be given the opportunity to develop a critical and responsible approach to digital technology, in order to see opportunities and understand risks as

> well as to evaluate information. The education will thus help students develop *digital competence* [...] (Swedish National Agency of Education, 2017a, p. 3)

In chapter five of the national curriculum with syllabi of the subjects, revisions have been made in the aim statements as well as in the core content in the subjects of crafts (woodwork and needlework), mathematics, physical education and health, science studies (biology, chemistry, physics), social studies (geography, history, religion, civics), Swedish (including Swedish as a second language) and technology. The knowledge requirements have not been revised. Overall, we identified four recurring themes in the curriculum revisions in the subjects: use of digital tools and media, programming, critical awareness and responsibility. The distribution of revisions is shown in Figure 1. This is to illustrate the indicator of distribution among the themes rather than counting the frequency of occurrences. In the following subsections, revisions in each identified theme will be explained, exemplified and analysed.

3.1 Use of digital tools and media

The most common revision (see Figure 1) in the syllabi, that permeates all the subjects, concern the addition "both with and without digital tools". This revision refers to the use of digital tools as a source of equipment among others to be used in teaching and as a tool in student work and when presenting their work. In particular, this is suggested when documenting studies and work processes, for example: "Documentation of the work process in words and images, both with and without digital tools"[2] (crafts, years 4-6) and "Documenting studies with tables, diagrams, images, and written reports, both with and without digital tools" (science studies, years 7-9). The phrase "both with and without digital tools" has in these cases simply been added to previous formulations. Similarly, in the subject of technology "digital models" have been added to the list of how the documentation could be done, where students before were going to document with "sketches, images and physical models.

[2] Revisions made in the curriculum are underlined to clarify what has been changed.

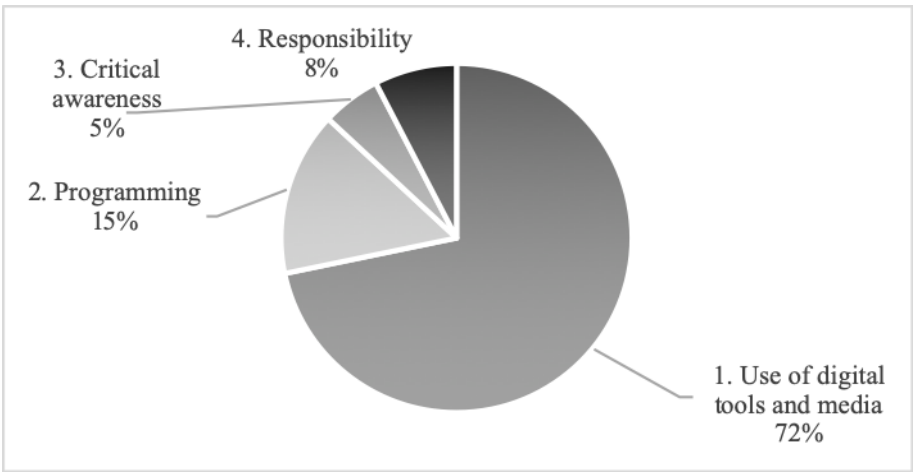

Figure 1. Distribution of revisions over themes in the syllabi of subjects.

Another subject area where the phrase "both with and without digital tools" have been added concerns orientation and spatial perception in the social study subjects and physical and health education, for example: "Spatial perception with the aid of mental and physical maps of local areas, for example the road to school, both with and without digital tools" (social study subjects, years 1-3) and "To orientate in unknown environments with the aid of maps and other tools for positioning, both with and without digital tools" (Physical education and health, years 7-9). What is notable in the core content of physical education and health, is that the phrase has not been added to a sentence about orienteering in years 1-3, but has been added for the following years. Similarly, in the subjects of mathematics the phrase has been added in years 4-6 and 7-9 concerning the construction of geometrical objects, but not in years1-3: "Constructing geometrical objects, both with and without digital tools" (years 4-6).

In the subject of civics, digital tools have only been added in years 1-3 whereas more explicit revisions apply in the later years, specifying certain media, and implicating a broader societal view that is inherent to the subject. Social media and webpages have, for example, been added as media that should be examined within the subject: "Different types of media, their structure and content, for example, social media, web pages, and newspapers" (years 7-9). Moreover, in the core content for years 7-9, insults in social media and how that relates to freedom of speech has been added as an example of an ethical and democratic dilemma connected to democratic rights and responsibilities.

Source criticism and the ability to critically evaluate information are central aspects of the subject of civics. Additions have been made to clarify that this should be done in digital media and with digital tools: "Methods to search for information from different sources: interviews, observations, and measures. How you evaluate and work with sources and information, both with and without digital tools" (years 1-3) and

"How you discern message, sender and purpose, both in digital and other media, with a critical approach" (years 1-3).

In the natural science subjects, the sources that students should be able to evaluate when conducting science studies have been broadened: "Interpreting and examining information connected to biology/physics/ chemistry, for example, articles in newspapers and films in digital media" (years 4-6). In this sentence, references are made both to digital media and also to films, rather than texts, as a source for receiving information within the subjects.

In the subject of Swedish, additions have been made relating to searching for information stating that this should be done with search engines on the internet (i.e. specifying digital search tools) already in years 1-3. Previously the use of search engines on the internet was in the core content for years 4-6. Moreover, the use of a number of different digital tools is implied in revisions where "Handwriting and writing with a computer" has been replaced by "… with digital tools" (years 1-3). Collaborative aspects of creating texts are implied by revisions throughout the years, stating that students should work both with their own and collaboratively created texts. In connection with oral presentations, additions have been made using the phrase "digital media and tools" as resources to use when doing your presentation. This addition has been made in all years:" Different aids, for example, digital media and tools, for planning and presenting orally" (years 7-9).

In the subject of technology, the students should create constructions using digital or physical models and use digital tools when working with blueprints and simulations (years 4-6 & 7-9). In crafts creatively using digital technology is addressed when the students are supposed to combine materials with digital technology (years 4-6 & 7-9). A connection to mathematics is found in the core content of crafts. However, this connection is not new, but what has been added to the core content is that the work can be done both with and without digital tools: "Two and three-dimensional sketches, models, patterns and work descriptions, both with and without digital tools. How they can be read, followed and connect to mathematical calculations" (years 4-6 & 7-9).

While the use of digital tools and media has mainly been added onto previous formulations, new clauses containing the phrase can be found in the subjects of Swedish and technology. In the subject of technology, there is a new clause concerning the use of digital tools when developing technology: How digital tools can support work with developing technology for example when doing blueprints and simulations" (years 7-9). In Swedish the new goal concerns texts in digital environments applied to all years: "Texts in digital environments for children, for example, texts with links and other interactive functions". This addition explicitly states that digital texts with certain features should be part of the curriculum and what is read and talked about within the subject of Swedish. Moreover, in Swedish the phrase "both with and without digital tools" has been added to the creation of texts: "Creating texts where

words, images, and sound interact, both with and without digital tools" (years 4-6 & 7-9). Both these examples from Swedish display an absence of progression over the years since the core content remains the same, or nearly the same, throughout the nine years of compulsory schooling.

3.2 Programming: learning about technology

The additions that relate to learning about technology and programming consist of several new formulations, both in the aim and in the core content of subjects, and fewer additions to previous statements. Moreover, new formulations addressing programming outlines a new content area within algebra in the subject of mathematics.

Learning about technology is mainly addressed in the core content of the subject of technology. Clauses have been added that aim to raise students' awareness of how computers, in particular, work, for example: "What computers are used for and some of the computers elemental parts for input, output and storing information, for example, keyboard, screen, and hard drive" (years 1-3) and "Some parts of a computer and their functions, for example, processors and working memory. How computers are steered by programs and connected in networks" (years 4-6).

Programming has mainly been added as part of the core content in mathematics and technology but is also mentioned in social studies and crafts. In mathematics, programming mainly concerns the subject area of algebra: "How step-by-step instructions can be constructed, described and followed as a foundation for programming. The use of symbols in step-by-step instructions". (years 1-3) and "How algorithms could be created and used when programming. Programming in visual programming environments" (years 4-6). In years 7-9 the programming should be done in different programming environments. These new clauses in the core content outline how students are expected to proceed with their programming skills throughout the nine years of compulsory school.

While programming in mathematics concerns what programming is, in technology the focus is on how it can be used in practice with technological objects: "To steer students' constructions or other objects with programming" (years 4-6) and "Applying steering and regulation on own constructions, with amongst other things programming" (years 7-9). In years 7-9, programming has been added to a previously existing clause, while the core content in years 4-6 is new.

In civics, additions have been made to the core content regarding: "How individuals and groups are portrayed, for example, based on gender and ethnicity, and how information in digital media can be controlled with underlying programming" (years 7-9). This addition connects to a revision in the aim of the subject of civics which states that: "Students should be given the opportunity to understand the significance of digitalization for societal development and personal integrity". Moreover, it relates to the core content in the subject of mathematics where the students should be given the opportunity to develop

their knowledge about how this kind of control can be conducted using programming. These connections imply that interdisciplinary collaborations between subjects could facilitate the students obtaining a deeper and broader understanding of how the digitalization of society affects them. Consequently, the revisions suggest that different subjects should and need to collaborate for students to become aware of connections between the different knowledge areas.

Problem-solving is a knowledge area connected in the curriculum revision to programming (Swedish National Agency of Education, 2017b, p. 9-10) and is addressed in the core content of mathematics for years 7-9: "How algorithms can be created, tested and improved when programming for mathematical problem solving".

3.3 Critical awareness

Revisions concern, in particular, the students' development of critical awareness of sources. Searching for information and critically evaluating what is found, is in particular focus and is stated in the aim of several subjects. Swedish has the main responsibility for teaching the students about how to search for information from a variety of sources (Swedish National Agency of Education, 2017b, p. 23). This ability should be applied to other subjects. Source criticism, on the other hand, is particularly in focus in the subject of civics and it is developed when students meet different kinds of sources throughout their schooling. In the additions to the core content, it is clarified that this should be done in digital media and with digital tools.

In civics, the core content includes additions that concern the digitalization of society and what it means for the individual: "The effect digitalization has on the individual, for example, increased possibilities for communication and electronic commerce" (years 4-6) and "The effect of digitalization in different areas on the development of society, for example, influences on the labour-market, infrastructure and changing attitudes and values" (years 7-9). Similarly to the additions concerning programming, these additions outline how students are expected to proceed from an individual perspective to a societal view on issues concerning digitalization (Swedish National Agency of Education, 2017b).

Technological effects on the labour-market are also mentioned in one of the additions in the subject of technology: "How technology is part of and changes the conditions for different professions and within all areas of society" (years 4-6). In the subject of technology aspects relating to limitations of technology and its relation to issues of sustainability are mentioned in years 7-9: "Internet and other global technical systems, the advantages, risks, and limitations of the systems" Issues concerning the protection of the environment are also addressed in the aim of the subject of technology, where revisions have been made that point out the individual's own use of technology and how this should be related to the impact it has on society and the environment.

All in all, additions concerning critical awareness relate mainly to the subjects of technology and social science. In the commentary to the revisions, it is pointed out that students should be able to distinguish between different kinds of sources and the interests that may lie behind a certain description of reality. The examples given relate to forestry and that students should be allowed to explore differences in information in textbooks, from environmental organisations and companies within the industry (Swedish National Agency of Education, 2017b, p. 23). This implicates that the students should be aware of the objective behind texts and that no texts are neutral in order to take a critical stance towards information in different environments.

3.4 Responsibility: risk-taking and safety

Similar to critical awareness, this theme is found in the subject of technology, Swedish and civics. In the subject of technology, safety concerning personal data and privacy is part of the core content and is developed throughout the compulsory school years, in the following statements: "Safety when using technology, for example when handling electricity and using different services on the internet" (years 1-3), "Safety when using technology, for example when transferring information in digital environments" (years 4-6) and "Safety when using technology, for example when storing and protecting data" (years 7-9). In the early years, safety issues appear to apply to all kinds of technology while in the middle and later years, the safety particularly concerns handling data in digital environments. The additions denote a progression in the areas that students should be able to take safety precautions, starting with the use of services and moving on to transferring information and finally to both storing and protecting data.

In the subject of civics, issues of safety are connected to a societal level. Already the aim of the subject includes statements that concern digitalization as one of the aspects that create both challenges and possibilities in contemporary societies. Personal integrity is also mentioned in the aim of the subject and how it relates to digitalization. In the core content, additions have been made concerning responsible actions in digital environments: "How to act responsibly when using digital and other media based on social, ethical and legal aspects" (years 4-6) and "Possibilities and risks connected to the internet and digital communication as well as how to act responsibly when using digital and other media based on social, ethical and legal aspects" (years 7-9). While the addition for years 4-6 is new, the same wording has been added on to a previous formulation in years 7-9 about possibilities and risks in digital environments.

Similar additions concerning how to act responsibly occur in the subject of Swedish, for example: "Responsible actions when communicating in digital and other media and different contexts" (years 4-6). Moreover, possibilities and risks connected to how language is used in digital media are addressed within the subject of Swedish: "Parlance and possibilities and risks when communicating in digital media" (years1-3).

4. Discussion and conclusion

The goal of this study was to explore how digital competence is conceptualized in recent revisions in the curricula for Swedish compulsory school as well as relating this conceptualization to international definitions. In so doing, our aim is to contribute to an understanding of the knowledge areas recognized as adequate digital competence needed for Sweden's' future citizens to be able to live and work in a digitalised and digitized society. As stated by Søby (2008) and Spante et al. (2018) the concept of digital competence is not clearly defined or used and can, therefore, be attached with different meanings in different contexts. The curriculum revisions are, on the one hand, concrete and adhere to certain subjects and their content. On the other hand, the questions about how to interpret them and to what extent, and in what ways, they will change existing teaching and learning practices, are at this moment in time an open question.

The findings of the analysis indicate a predominantly operational and tool-oriented view of digital competence which emphasises digital tools and media and how to use them. The four recurring themes outlined in our analysis can be compared to what the Broadband commission (2017) considers to be generic digital skills. Basic skills are to some extent addressed in the core content in the subject of technology where the students learn how computers work. Otherwise, it appears that basic skills are largely taken for granted in compulsory school in Sweden. Higher-level skills are mainly addressed in the additions concerning programming, where digital technology is used for empowerment and transformation. Critical aspects are predominantly related to evaluating information and the sources used, while not much is said about how to critically understand and apply digital technologies in themselves. These findings are similar to the indications found in the quick-scan analysis of existing frameworks made by Iordache et al. (2017) which show a primary focus on operational skills, as well as a recognition of information-searching and communication skills albeit lacking in reference to social contexts and strategic skills.

Our findings thus demonstrate that the conception of digital competence in the revised subject areas in the Swedish curriculum for compulsory school strengthens students' digital abilities mainly on the operational level and to some extent to programming, critical awareness, risk-taking and safety in the subjects. Influenced by the European conceptualization of digital competence for life and work (European Commission, 2017), our study indicates a tendency in the curriculum revisions to view the digitalization of education as a matter of implementing a new tool at the operational level, while downplaying other aspects. The thematic analysis of the revisions in the different subjects thus reveal a tendency to addressing the usage of digital technology in schoolwork. This leads to a narrow conceptualisation of

digital competence as mainly concerning the operational aspects and the implementation and increased use of a tool.

However, chapters one and two in the curricula, addressing fundamental values and goals, display a somewhat different approach. Here connections to broader conceptualizations of digital competence are made, such as understanding changes in society, problem solving and processing of information. This difference could be seen as a sign of how curricula are affected both by transnational policy trends and the local context. Policy trends, characterized by a move from content-based curricula towards competence-based ones (Nordin & Sundberg, 2018), are discernible in the syllabi of subjects, whereas societal aspects, connected to the local Swedish context, are addressed in the chapters relating to the overall values and goals of education in Sweden.

That revisions have been done exclusively in the core content of subjects signifies that digital competence is considered to be part of content standards, rather than performance-based standards (Jönsson, 2015). Furthermore, a majority of the revisions are the same for all years and lack qualitative elaborations regarding the progressive development throughout the school years and also to the knowledge development in relation to subject content. The curriculum does not give any clear directions of how the students are expected to develop their operational skills throughout their schooling when using digital tools and media, thus, implying that the actual usage of digital tools and media is sufficient. The absence of revisions in the knowledge requirements further adds to the uncertainty of what and how to assess the use of digital tools and media in different years and subjects.

Though the focus in this article has not been in particular on multimodal aspects, it is interesting to note that although Elf et al. (2018) see a clear connection between multimodality and the usage of digital technology, the concept of multimodality is mainly implicitly present in the revisions in the Swedish curricula. Since no revisions have been made in the knowledge requirements, the qualitative aspects that Elf et al. (2018) see as essential to incorporate are still more or less absent.

Since assessment according to the Swedish curricula should be based on how students are able to use their knowledge, rather than the extent to which they can reproduce knowledge, the absence of digital aspects and progression in the knowledge requirements reinforces the notion of digital competence as a technical skill. That is, on the one hand, digital competence is needed to acquire core content and, to some extent, when presenting the acquired knowledge. On the other, digital competence does not play a significant role when students display their know-how and how they apply and use the knowledge.

To conclude, considering the significant role that digital devices and digital environments have in many peoples' everyday practices, particularly youngsters, the absence of aspects of digital competence in the knowledge requirements is quite striking. Furthermore, the findings of Elf et al. (2018) that indicate a move from reception to production, points to the need to include digital competence as part of

performance-based standards in order to acknowledge and adequately evaluate students' ability to use their acquired knowledge.

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