# Student Teachers' Didactic Choices and Motives when Designing Digital Competence Education: Pupils' Age as a Didactic Dimension

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This study furthers the understanding of how student teachers make didactic choices when designing digital competence education. It investigates what age groups student teachers choose to include in digital competence education, how they motivate these choices, and how their choices can be understood within the context of the university course in which they designed this education. The material includes 48 papers written by student teachers within a Swedish university course in which they each designed a project intended to promote digital competence among pupils in school-age educare (children aged 6 to 12 years). These papers were analyzed using a mixed-method approach involving both qualitative and quantitative analysis. The perspectives on age as a didactic dimension developed by Klafki and Comenius and the concept of *boundary-work* were used as a theoretical framework to analyze student teachers' didactic choices. The results show that students most commonly choose to include older pupils, namely those in Grade 3 and 4 (9–10-year-olds), while paying less attention to the younger pupils. They motivated their choice of age groups based on arguments related to three key themes: children's media use, children's capacities, and their own future needs and circumstances as teachers. One implication of the study is that teacher education courses on digital competence should emphasize age as a didactic dimension and encourage student teachers to critically reflect on their assumptions about children's age and capabilities.

Keywords: age, didactics, digital competence, school-age educare, teacher education.

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## Introduction

Children have the right to an education in which they can develop digital competence (European Union, 2017; Swedish National Agency for Education, 2022; UN, 2021). This applies to children of all ages and to different educational contexts, such as pre-school, elementary school, and school-age educare. What digital competence entails has been extensively examined in research papers and policy reports, yet there is no universally accepted definition. Digital competence can be understood as an evolving boundary concept that is subject to change due to the constantly changing digital environment (Ilomäki et al., 2016). Nevertheless, there are some core aspects running through the various existing definitions of the concept: In most definitions, digital competence entails not only having technical skills—namely, being able to use digital technology in a meaningful way in everyday life, work, and education—but also understanding the phenomenon of digital technology and approaching digital media in a critical and responsible manner (Buckingham, 2015; Hobbs, 2011; Ilomäki et al., 2016). Hence, digital competence involves a complex entanglement of skills, knowledge, and attitudes and the ability to apply them in various changing contexts (Illeris, 2013).

Teacher education plays a crucial role in ensuring children's right to digital competence education. It prepares future teachers to make relevant didactic choices and problematize these choices in order to develop education that is relevant for children's present and future lives (Englund, 1998). In this study, "didactic" refers to the Central and North European "didaktik" tradition, which (in brief) is the theory and practice of teaching and learning (Gundem, 2000, p. 236). This usage differs from how "didactics" is commonly understood in English-speaking countries, where the term often carries a negative or outdated connotation, typically describing someone who lectures excessively (Hopmann & Gundem, 1998, p. 334).

The importance of teacher education in relation to digital competence is evident in the abundance of research on this topic (e.g., Røkenes et al., 2022). However, most studies focus on student teachers' own digital competence and ability to manage teaching in a digitalized school environment *with* digital technologies, whereas student teachers' future task of teaching *about* digital competence has received less attention (see the literature review below). The present study contributes to this latter research area. It directs focus to one particular aspect that has not gained in-depth and systematic attention in previous research, namely age as a didactic dimension. Thus, this study aims

to problematize and further the understanding of how student teachers make didactic choices regarding pupils' age when designing digital competence education in the context of a teacher education course at a Swedish university. The research questions guiding the study are as follows:

- What didactic choices regarding pupils' age do student teachers make when designing digital competence education, and how do they motivate these choices?
- How can student teachers' didactic choices and motives regarding pupils' age be understood within the context of the university course?

The present study focuses on one specific group of student teachers: future teachers in Swedish school-age educare. School-age educare, which children from pre-school class to Grade 6 can attend before and after school and during holidays, is an integrated part of the Swedish educational system and is regulated by the national curriculum. The national curriculum states that school-age educare must focus on teaching digital competence, including critical and responsible use of digital media (Swedish National Agency for Education, 2022). In Sweden, the school-age educare teacher program is three years in length and prepares students to work in school-age educare and to teach one subject which can be for example music or sports education. Student teachers in this program are particularly interesting to study when it comes to the selection of age groups for digital competence education because they can choose from a broad age span (children 6 to 12 years of age).

The present study contributes to a better understanding of how student teachers design digital competence education and how they view pupils' age in relation to this teaching. Revealing student teachers' choices and motives makes visible future teachers' assumptions regarding children in relation to this subject matter and makes these assumptions possible to scrutinize and problematize. In essence, the study concerns how future teachers make judgments about which children should have access to digital competence education and which are excluded based on their age. Perceptions of children's age in relation to this content might influence student teachers' future work and affect children's opportunities to develop digital competence. This ties into a broader discussion about how adults' perceptions of children's age and maturity can impact children's lives. In a study on children's right to participation, Lundy (2007) argues that adults' assumptions about children's capabilities can significantly affect their rights. When adults judge that certain groups of children lack competence, they often exclude their perspectives from the decision-making process. Hence,

the results of the study can be useful for both in-service and pre-service teachers; they can serve as a point of departure for reflection on teachers' own didactic choices and motives in relation to children's age, which may lead to a more reflective approach in designing digital competence education. The results can also be useful for teacher educators when preparing teacher education courses on digital competence because they enable educators to identify and reflect upon possible problematic issues.

## Literature Review

Most research on teacher education and digital competence has centered on evaluating and measuring student teachers' or teacher educators' digital competence (Andreasen et al., 2022; Esteve-Mon et al., 2020; Fraile et al., 2018; Galindo-Domínguez & Bezanilla, 2021; Røkenes et al., 2022). Further, it has explored student teachers' development of digital competence and the educational opportunities provided in teacher education (Almås et al., 2021; Brevik et al., 2019; Haşlaman et al., 2023; Instefjord, 2015; Instefjord & Munthe, 2017; Pettersson, 2018; Røkenes & Krumsvik, 2016; Røkenes & Krumsvik, 2014). Accordingly, this research has primarily focused on digital competence as an important prerequisite to manage teaching in a digitalized society; in other words, focus is directed to teaching *with* digital technology. In contrast, the present study directs focus to teaching *about* digital competence (as a learning content per se) and how student teachers are prepared for this task in their future work.

However, there is a small body of research focusing on how student teachers and teachers view teaching about digital competence. Age as a didactic dimension is not the main focus of these studies, but a close reading provides some valuable insights for the present study. The first subsection of the literature review discusses previous studies dealing with student teachers' views, and the second focuses on teachers' views. Some of the studies included in this literature review use the concept of *digital competence*, while some refer to *digital literacy*. These concepts are closely related and are often used interchangeably (Ilomäki et al., 2016).

### *Student Teachers' Perspectives*

A few studies have a focus similar to the present study, centering on teacher education courses on digital literacy. Using qualitative methods such as interviews and textual analyses of student

teachers' texts, these studies capture how student teachers view the task of teaching digital literacy to children. These studies focus on future teachers in different school-contexts; however, there is no research focusing particularly on teacher education for school-age educare.

Based on a case study from Switzerland, Botturi (2019) analyzes an introductory course in digital literacy education for future teachers in pre-primary and primary school. Botturi shows how student teachers during the course broadened their views on what to focus on in teaching, moving from emphasizing safety and protection to seeing critical media literacy as a central component in digital literacy teaching (p. 155). Botturi also shows how they thought that digital literacy education was more relevant for older pupils (Grade 3 and above) as they, for instance, are better at reading and writing (p. 159).

Similar to Botturi, Lähdesmäki and Maunula (2022) focus on a Finnish teacher education course and analyze what specific new literacy skills in media education student teachers consider important. The results show how student teachers argued that teaching should focus on issues such as the narrative meaning of images, virtual games, and cyberbullying. The students argued that this content was relevant for children and young people in general, so they did not develop more detailed discussions regarding pupils' age. In the discussion, the authors problematize what they considered as limitations in student teachers' approaches. One limitation was the lack of "perspectives on the development of new literacies" and lack of discussion on "pedagogical solutions" (p. 436). The lack of focus on age suggests that the student teachers did not view pupils' age as the most pressing issue.

Focusing specifically on the integration of critical digital literacy and video production in a Canadian teacher education course in language and arts, Watt (2019) analyzes how future elementary school teachers view teaching this content to elementary school children (Grades 3–6). In instructional plans for children in Grades 3–6 students argued for the relevance of teaching critical digital literacy to pupils, including themes such as gender stereotypes in the media and in advertising (p. 90). However, they did not discuss teaching this content specifically in relation to pupils' age. The issue of age only surfaced in relation to one of the projects, where students argued that pupils "at the Grade 6 level can relate to the topic of gender roles and advertising, making this a developmentally-appropriate means to engage these key areas of critical literacy" (p. 91). The

student teachers also commonly argued that children in this elementary school can find video production engaging and motivating.

### *Teachers' Perspectives*

When it comes to teachers' views on digital competence education, a few studies focus particularly on school-age educare. For instance, Martínez (2019, 2021) has studied how teachers promote critical digital literacy and responsible online communication in school-age educare, focusing on content selection and teaching methods. Although Martínez's studies did not primarily focus on age, their results provide some insights into teachers' views of age as a didactic dimension. With regard to teaching critical digital literacy, Martínez (2019) reports that most teachers had promoted this competence, particularly source criticism, to children of different ages. However, some teachers stated that they did not teach critical digital literacy, and one teacher in Grade 1 argued that this content becomes relevant in secondary school. Regarding the promotion of responsible communication online, Martínez's (2021) results show that teachers mostly considered this aspect of digital competence relevant for children in Grade 3 and above because children at this age start to use social media more frequently. Some teachers had not worked with promoting a responsible approach to online communication, either because of their pupils' young age (pre-school class and Grade 1, approximately 6–7 years old) or because of a lack of need for the particular group of pupils as they did not yet have conflicts on social media.

In a study focusing on Swedish pre-school teachers' views of children's adequate digital competence, Masoumi and Bourbour (2024) show how teachers considered it important to teach digital competence to all children, regardless of age, including the various dimensions of digital competence, such as being able to use digital tools and having a critical and ethical approach. The teachers touched upon children's age in the interviews, focusing on how to adapt this teaching content to very young children. Moreover, they considered teaching digital competence challenging and stressed the need for a balance between digital and non-digital experiences; for instance, some teachers argued that "analogue activities need to remain a core part of the work teachers do in developing young children's digital competences" (p. 20620). Differences between younger and older children in pre-school were discussed only in relation to teaching a critical approach to digital media, where teachers argued "that it was possible to discuss with older children what is or is not

'real' on the internet, while with younger children it was necessary to demonstrate and exemplify how pictures and movies can be manipulated" (p. 20623). That is, the teachers' stance was not that younger children should be excluded from learning this content but that they needed to determine *how* to teach it.

Directing attention to primary and secondary school teachers, Gouseti et al. (2023) explore how teachers in four European countries view and teach critical digital literacies, specifically what particular aspects of critical digital literacies teachers focus on in their teaching. Despite age not being a main concern in this research, the results show how teachers generally considered it important to teach all children critical digital literacy. A more detailed discussion on age was offered by primary school teachers in England, who stressed the importance of teaching children aged 7–9 years about online safety because that is the age range when they begin to use social media. However, teachers believed that teaching about information literacy was less relevant due to children's young age. One teacher stated that children view fake news "higher up in the school" (p. 11) and that it therefore becomes important to understand which websites are trustworthy sources and which are not.

### *Summary: Age as a Didactic Dimension in Previous Research*

Previous research depicts a complex picture of student teachers' and teachers' different views on children's age in relation to digital competence education. One view is that digital competence education is important for all children, including the youngest (e.g., Gouseti et al., 2023; Lähdesmäki & Maunula, 2022; Martínez, 2019). Another view identified in previous research is that digital competence education is more relevant for the older children in elementary school and hence not as relevant for the younger children, for various reasons (e.g., Martínez, 2019, 2021; Botturi, 2019; Gouseti et al., 2023). A final view also emphasizes the relevance of digital competence education for children regardless of age but requires teaching methods to be adjusted according to children's age (e.g., Gouseti et al., 2023; Masoumi & Bourbour, 2024). While previous research provides valuable insights, student teachers' (or teachers') didactic choices and motives regarding age as a didactic dimension have not previously received in-depth and systematic attention.

## Conceptual Framework

This section presents the conceptual framework used in the study to analyze student teachers' didactic choices and motives regarding age as a didactic dimension when designing digital competence education.

### *Pupils' Age as a Didactic Dimension*

To understand age as a didactic dimension, the present study uses frameworks developed by two prominent theorists within the field of didactics—Wolfgang Klafki (1995) and Johan Amos Comenius (1999 [1632])—who discuss the selection of content in education in relation to pupils' lives. In Klafki's article "Didactic analysis as the core of preparation of instruction" (1995) and Comenius's *Didactica Magna* (1999 [1632]), the selection of content is related to two different time perspectives in children's lives. On the one hand, teachers must focus on children's future lives, selecting content for education that has relevance for children in the future (Comenius, 1999 [1632], pp. 164–165; Klafki, 1995, pp. 18, 21–24). On the other hand, teachers need to focus on children's present lives and select content that is relevant to their current situation. The issue of pupils' age is primarily connected to this latter time perspective, where focus is put on how content in education is useful in children's present lives inside and outside school (Comenius, 1999 [1632], pp. 161–165, 211; Klafki, 1995, p. 23) and whether children in a particular age (or grade) can relate to and have the cognitive capacities to comprehend the content (Comenius, 1999 [1632], pp. 153, 158–159). If the student cannot grasp the content, it "cannot be knowledge which contributes to *education* (*Bildung*)" (Klafki, 1995, p. 24).[1] Comenius (1999 [1632]) writes about the need to connect teaching to children's own sphere, where age is one defining aspect: "One should not burden the student with things that are beyond the reach of his age, his comprehension, and his needs at this time … Teaching must be connected to things that lie within his sphere" (p. 211, author's translation).

These two-time perspectives will be used in this study to interpret how student teachers motivate the selection of age in their didactic design, where the perspective of pupils' future lives relates to

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1 Klafki (1995) argues that Bildung should be understood broadly, encompassing "the world of the mind, the habits of the young person as a whole" (p. 25).

children's needs in the future and the perspective of pupils' present lives relates to children's current needs and their developmental stage.

*Boundary-work*

Preparing for teaching involves a complexity of didactic choices to include or exclude certain contents, methods, age groups et cetera. Accordingly, constructing a didactic design also involves the construction of boundaries. Therefore, the concept of *boundary-work* will be used to explore how student teachers motivate their didactic choices regarding age when designing digital competence education. This concept, originating from Gieryn's (1983) study of how scientists demarcate science from non-science, has been used to study a multitude of social phenomena and examine how they are constructed through demarcations (Lamont & Molnár, 2002). When engaging in boundary-work, people characterize social phenomena (such as social classes, professions, and age groups) by making distinctions, including or accentuating certain aspects in a category while excluding or downplaying others (Åkerstöm, 2002). In this study's context, student teachers can be seen as engaging in *didactic* boundary-work when designing digital competence education within the university course.

## Method

This section describes the study's design, data collection, and data analysis. It ends by presenting the ethical considerations guiding this study.

*Design and Data Collection*

To explore student teachers' didactic choices and motives, this study draws on 48 papers written by student teachers in the Spring of 2020. These papers were written within a nine-credit university course at a Swedish university and formed part of the course examination. The course was part of a teacher education program preparing students for work in school-age educare, and it focused on digital competence and learning. Specifically, it centered on three main themes related to digital competence: critical reflection of digital media, responsible use of digital media, and creative content production (see Hobbs, 2011; Ilomäki et al., 2016). The course familiarized students with *what* to teach in digital competence education, *why* this teaching is important, and *how* teaching can be conducted – hence the central didactic questions in didactic design (Gundem, 2000). However,

when this study was conducted, the course did not explore the question of pupils' age in depth; age was only discussed in parts of the course literature and in one lecture focusing on children's media use. Hence, the students could draw on different sources including their own experiences when making didactic choices regarding age, and they were not firmly steered in any direction. On the contrary, they were encouraged to be creative when designing digital competence education and to base their arguments on relevant sources. Student teachers were enabled to creatively design their projects, and in this endeavor, they actively interpreted the literature while also drawing on their previous experiences from working in school-age educare.

The papers written within the course and analyzed in the present study presented projects aimed at promoting digital competence among pupils in school-age educare. The instructions for the papers were that the proposed project should promote different dimensions of digital competence and that students should discuss and justify the project's focus and design in relation to the didactic questions *what*, *how*, and *why*. In addition, they were instructed to address the question of *who*, namely, which pupils the project is aimed at (age, number of pupils, etc.).

Using student teachers' texts as a source to gain insight into their perspectives and judgments can be problematized. In contrast to qualitative interviews, written papers do not allow for follow-up questions. Hence, using qualitative interviews could have provided more in-depth insights (Brinkmann & Kvale, 2015). To enable students' perspectives to emerge through written course assignments, instructions need to be open-ended (Lähdesmäki & Maunula, 2022; Watt, 2019). As described above, the papers used in the present study had open-ended instructions, allowing students to make reflective choices. Nevertheless, the course design obviously contributed to shaping student teachers' perspectives. Therefore, the analysis has to consider student teachers' didactic choices and motives within the context of the university course.

### *Data Analysis*

The present study used a mixed-method design involving both qualitative and quantitative analysis of students' texts. The analysis focused initially on the first research question: What didactic choices regarding pupils' age do student teachers make when designing digital competence education, and how do they motivate these choices? The analysis was conducted according to the following steps:

1.  All 48 papers were analyzed with the aim of identifying the age groups (in terms of school grades) for which the projects were designed. This was commonly stated early in the papers. Thereafter, a quantitative analysis was conducted to identify the preferred age groups selected by the student teachers. This provided an overview of student teachers' didactic choices regarding age as a didactic dimension.

2.  In the next step, all papers were analyzed using qualitative coding (Bazeley, 2011) to identify students' motives for directing their projects to certain age groups. Based on a close reading and comparison of the motives found in the papers, the analysis revealed three recurring themes: "children's media use as motive," "children's capacities as motive," and "students' own future needs and circumstances as motive."

3.  The three themes were analyzed using the conceptual framework. Based on Klafki (1995) and Comenius (1999 [1632]), the analysis examined how student teachers motivated their focus on particular age groups with reference to the time perspectives: pupils' future lives and pupils' present lives. Using the concept of boundary-work, the analysis investigated how student teachers in their didactic choices made distinctions between older and younger pupils and characterized children in certain ways (such as discussing children's capacities). Thus, student teachers' views of children of different ages surfaced.

Having identified student teachers' didactic choices and motives, the analysis focused on the second research question: How can student teachers' didactic choices and motives regarding pupils' age be understood within the context of the university course? The analysis was conducted in the following steps:

1.  Student teachers' different motives for directing their projects to certain age groups (according to the three themes mentioned above) were assessed based on the sources that grounded them. Some student teachers referenced the course literature, while others did not provide any references or referred to their own experiences from working in school-age educare.

2.  To understand student teachers' didactic choices within the context of the course, the use of sources in their motivations was analyzed in relation to the course design as a

whole. This elucidated how student teachers interpreted the literature and how they picked parts of the literature to support their arguments while neglecting other parts.

### *Ethical Considerations*

The author of the present paper was the university course's director and main teacher; therefore, the study required careful ethical considerations. The study participants may have been in a vulnerable position in relation to the researcher due to their student–teacher relationship (Dibley et al., 2020, p. 75). Voluntary participation was secured by clearly informing the students that if they choose to participate, the analysis of their papers for research purposes was to be conducted after they completed the course and their grades were finalized. In addition, an informed consent form was distributed to students through the digital platform used for course work; the form included information about the purpose of the study, the voluntary nature of participation, and the confidentiality of their personal information. Of the 57 student teachers enrolled in the course, 48 provided their informed consent to participate in the study. Accordingly, 48 papers were included in the analysis.

As the study did not collect sensitive personal data or involve other aspects that require ethical review, a formal ethical review was not obtained (Swedish Ethical Review Authority, 2023, p. 86). However, as stated above, careful ethical reflection and respect for students' perspectives, autonomy, and wellbeing were integral to the study. In addition, as argued in the introduction, the results of the study are meant to support student teachers and teachers in their work; therefore, the study was conducted with their best interest in mind.

## Results

The first subsection of the results presents the quantitative analysis of age as a didactic dimension. This is followed by three thematic subsections focusing on student teachers' motives for choosing certain age groups in their projects. These three subsections are (1) children's media use as motive, (2) children's capacities as motive, and (3) students' own future needs and circumstances as motive. However, before focusing on the findings, a short overview of the central elements of the students' projects is presented. This presentation contextualizes the findings and focuses on the *what* and the *how* of the didactic design. Student teachers are in the following called "students."

In the analyzed papers, most students chose to promote responsible media use or a critical approach to digital media, which they often combined with a focus on digital media production. Only a few projects focused solely on media production or programming. The projects focusing on responsible media use mainly concerned communication with other people through digital media (e.g., how to "be kind" and "a good friend" online, how to act if someone is offended online, and how to deal with cyberbullying and online hate) as well as ethical aspects related to content production (e.g., photographing other people). In the projects focusing on a critical approach to digital media, the students addressed information search, source criticism, critical understanding of news and false information online, and critical understanding of online advertising.

Most projects used two main methods for teaching digital competence: group discussions and media production (news videos, blogs, animated films, etc.) using iPads. The projects commonly started with teacher-led group discussions, followed by several weeks of media production, and often ended in some form of film festival where pupils' media productions were displayed to other pupils and sometimes also to parents and other teachers. Students motivated the teaching of digital competence by referring to the digitalization of society in general and children's lives in particular. They also quoted passages from the curriculum related to digital competence and digitalization and passages not directly related to digitalization, such as the importance of ethical perspectives in education. The students commonly argued that children's interests (including their interests in the media) are an important part of the pedagogy in school-age educare and therefore should be acknowledged by teachers and integrated into teaching.

*Preferred Age Groups for Digital Competence Education*

Most students chose to direct their projects to the older pupils in school-age educare: 64% of the projects were aimed at pupils in Grade 3 or above (30 projects). Most projects were directed to either one grade (18 projects) or two grades such as grade 3–4 (14 projects), but some were geared towards three grades (6 projects), four grades (6 projects), five grades (2 projects), or all grades (1 project). One student did not specify the grade or pupils' age. Counting the grades represented in all the projects, the results show that the most common grade was Grade 3 (30%), followed by Grade 4 (23%), Grade 5 (13%), Grade 2 (13%), Grade 6 (10%), Grade 1 (8%), and the pre-school class (3%). That is, students generally favored the older pupils (mainly those in Grades 3 and 4), while the youngest pupils (in pre-school class and Grade 1) received little attention. This contrasts

with the actual distribution of pupils in school-age educare, where the younger pupils (aged 6–8 years) attend school-age educare to a much larger extent than the older pupils (Swedish National Agency for Education, 2023).

The following subsections discuss the students' motives for including certain age groups in digital competence education.

### *Childrens' Media Use a Motive*

One common argument in the students' texts concerned the nature of children's media use. Students commonly argued that their projects were relevant for pupils aged 9 years and older (from Grade 3) as most children start using digital media—social media in particular—more extensively by that age and, therefore, need to develop a critical and responsible approach to digital media. Consequently, the nature of children's media use, which is related to their age, becomes a parameter when making didactic choices in digital competence education. This reflects the ideas promoted by Klafki (1995) and Comenius (1999 [1632]) that teachers should focus on content that is useful and needed in children's present lives, that lies within their "sphere," and that they can relate to. One student (paper 9), who focused on pupils in Grades 3 and 4, wrote the following:

> The reason why I chose to have these two grades is because most children have received a phone by this point, which also means that they usually have free access to the internet and social media, which requires a great deal of responsibility. There is a large flow of images coming to the students via their phones, and as an adult, it can be difficult to keep track of what is happening when they are out on the internet. Therefore, it is important that the students get a proper foundation to stand on when it comes to looking critically at pictures, but also to gain an understanding of how other people react if you comment on pictures in a negative way.

The student argued that "most children" in Grades 3 and 4 have their own smartphone, which gives them access to social media, and that they need "a proper foundation" to be critical and responsible media users. In this way, the student created a boundary for when digital competence education becomes relevant in children's lives, thereby excluding younger pupils (who supposedly have less developed media use) from educational opportunities.

When motivating designing their projects for older pupils, students referred to their own experiences from working with children in school-age educare or referred to facts about children's media use that had been presented in lectures and in the course literature, while some students did

not provide any sources. For instance, they used statistics from the Swedish Internet Foundation (2018, p. 62) regarding children's (0–10 years) daily internet use in 2018, where the highest level of daily internet use was found among the 9- and 10-year-olds, and interpreted them to mean that there was an increased internet use among nine-year-olds. However, these numbers in fact show a steady increase, which was also emphasized by the lecturer. Students also cited the course book by Hedlund and Malmsten (2016), using one part of the book where the authors propose that teaching in Grades 3 and 4 can focus on friendship and the sharing of photos on social media (p. 28); meanwhile, they disregarded the parts indicating that pupils in Grade 1 use social media platforms (p. 64).

While most projects were directed at the older pupils, some were designed for pre-school class to Grade 2 (pupils aged 6–8 years). These students argued that it is important to work proactively before children start using social media. This resonates with Klafki (1995) and Comenius (1999 [1632]) stating that teaching must be based on children's needs in their future lives. For example, a student who designed a project for pupils in Grades 1 and 2 (paper 6) explained,

> The reason I have specifically chosen this age group is because the content of the project is considered adequate based on their age and their expected use of social media. ... I also want to believe that it is precisely at this age that we still have the opportunity to influence preventively and get the children to see and use social media in a better way purely in terms of values.

This student promoted the idea that digital competence education is most relevant and effective at an early age, before children start using social media. In this way, a boundary is created towards older pupils who are considered less susceptible to this teaching. While this student based the argument purely on personal beliefs, another student drew on one formulation in the course book which states that children most commonly start to interact with other people in online games from the age of 8 years (Hedlund & Malmsten, 2016, p. 20). Therefore, the student argued, it was relevant to work proactively on responsible online communication with pupils between 6 and 8 years of age.

A few projects were aimed at a broader age span, including also the youngest pupils. These students argued that children of all ages use digital media to some extent and need to be able to reflect critically on the content they encounter. For instance, one student (paper 25) chose to focus on pupils aged 6 to 10 years:

> The project will be aimed at a mixed age group between six and ten years. The reason I don't choose to separate the age groups is that every child uses some form of digital tool at a young age. Hedlund mentions that children in today's society have at some point used digital tools at home. (Hedlund & Malmsten, 2016, p. 65)

This student based their inclusion of a broad age span on children's experiences of using digital media in their present everyday lives. This, again, resonates with Klafki's (1995) and Comenius's (1999 [1632]) emphasis on the need to connect teaching to children's present lives. This student also cited the course book by Hedlund and Malmsten (2016), which illustrates how this source could be used in a wide variety of ways when making didactic choices to either include or exclude younger pupils in digital competence education.

### *Childrens' Capacities as Motive*

Another common argument in the students' papers pertained to the perceived nature of children's capacities. Here, students motivated their focus on older pupils (from Grade 3) based on the pupils' greater capabilities. This argument was commonly connected to a developmental perspective, where teaching is designed in relation to children's cognitive development. This resonates with Kalfki (1995) and Comenius (1999 [1632]) stating that teachers need to choose content that children have the cognitive capacities to comprehend. For instance, students argued that pupils in Grades 3 or 4 had the cognitive capacities required for engaging in projects promoting critical and responsible media use. Two students, focusing on grade 4 and above, wrote:

> I mean that in middle school age, they have enough cognitive competence to be able to handle various ethical issues, as well as being able to protect their own personal integrity. (paper 26)

> This project is aimed at students in Grades 4–6. ... The aim of the project is to promote a critical attitude about the subject of advertising, and it requires a certain abstract thinking; therefore these ages are more appropriate. (paper 33)

These students referred to children's capacities to handle ethical issues and to engage in abstract thinking. They connected these capacities to the older pupils in school-age educare and perceived younger ones as lacking these capacities, thereby creating another boundary between the older and younger pupils. These students did not provide any sources to back up their arguments, indicating that they drew on their own common-sense understanding. However, one student referenced Hedlund and Malmsten (2016, pp. 26–27) when arguing for a project directed to pupils in Grade

3 based on children's cognitive capacities, referring to a passage stating that teaching in Grades 2 and 3 can focus on source criticism initiated in Grades 1 and 2.

Another motive for engaging older pupils (Grade 3 and above) in digital competence education was that these pupils have the capacity to work more independently than younger children. Students commonly argued that pupils in this older age group can work more independently with digital tools. Some students argued that this was important as they do not need to put effort into teaching how the digital tools work (most projects involved media production, as described above), allowing them to focus on discussion and reflection to promote a critical and responsible approach to digital media. Other students argued that it was important to work independently with digital devices so that pupils can create their own social relations, which is an important part of pedagogy in Swedish school-age educare (Swedish National Agency for Education, 2022). In addition, some students argued that the capacity to work independently with digital tools facilitates teaching in school-age educare centers in particular because they often have large groups of children and few teachers. Two students directing their projects to Grades 3 and 4 wrote,

> The choice to direct the project to Grade 3 is due to the fact that these students are not as dependent on the support of adults in the use of digital tools as younger students can be (Hedlund & Malmsten, 2016). Choosing students in a higher year group with less demand for support also benefits the current situation with a lack of staff density and a lack of trained staff at several after-school centers (Skolinspektionen, 2010). (paper 32)

> The film project has been selected for grades 3–4, as film projects are time-consuming and require greater initiative and participation from the student group, which are abilities students begin to develop in Grades 3–4 (Hedlund & Malmsten, 2016). (paper 1)

Students motivated choosing Grades 3 and 4 based on the idea that they can work more independently, thus creating a boundary that excluded younger pupils based on their presumed cognitive development. These students used the course book by Hedlund and Malmsten (2016), referring to a chapter on film production which states, "The older pupils in grades 3 and 4 usually manage a lot by themselves" (p. 106, author's translation). However, Hedlund and Malmsten (2016) also made more nuanced statements regarding children's age, such as "Some groups with older children may be able to manage the filming themselves, while others may need an adult" (p. 118, author's translation).

### ***Students' Own Future Needs and Circumstances as Motive***

A didactic perspective on teaching places pupils' needs and conditions at the center of attention (Comenius, 1999 [1632]; Klafki, 1995). However, the results show that students also motivated the selection of age groups for their projects based on their own needs and circumstances. Students explained that they chose to focus on the younger pupils in Grades 1 and 2 because they will work with this age group after finishing the teacher education program, they were currently working with this age group, or they had worked with children of this age. One student (paper 45) wrote,

> The project is aimed at 30 students at a school-age educare center who are in grade 1. This is a conscious choice as I will carry out the project at my future workplace, where I will be responsible for teaching in a center where students in grade 1 attend.

Students' own circumstances and needs as motive most commonly concerned teaching the younger pupils. Hence, one could argue that students' arguments for including younger pupils in digital competence education were less didactically developed. This motive can be understood in relation to the course itself, where the course director tried to motivate the students by saying that they could make use of their projects after finishing the program. The future use of the project as motivation became connected primarily to the younger age groups because most school-age educare teachers work with the younger pupils (Swedish National Agency for Education, 2023). Hence, the course director's strategy to motivate students to engage in the planning of digital competence education by connecting it to their future lives may have led to the use of less didactically developed arguments in some projects.

## Discussion

This study aimed to investigate how student teachers make didactic choices regarding pupils' age when designing digital competence education. In this section, the main results are summarized and discussed in relation to previous research, suggestions for future research are proposed, and the implications of the results are outlined.

The first research question concerned what didactic choices regarding pupils' age student teachers make when designing digital competence education and how they motivate these choices. The quantitative analysis of students' papers revealed that students most commonly choose to design digital competence education for older pupils—namely those in Grades 3 and 4 (9-10-year-olds)—

while paying less attention to the younger pupils. The qualitative analysis made visible students' motivations for including certain age groups in their project proposals. Three key themes emerged. First, the students used arguments related to children's media use to motivate focusing on older pupils; they argued that there was a need to foster a critical and responsible approach to digital media among older pupils due to their extended media use. The group of students whose projects were aimed at younger pupils argued that proactive work is needed before children start using social media or that all children use digital media to some extent and need to develop digital competence. Second, the students used arguments related to children's capacities to include the older pupils in digital competence education and exclude the youngest; these arguments are based on the idea that older pupils possess the capacity for ethical and abstract thinking as well as the ability to work more independently. Third, student teachers who chose to focus on younger pupils motivated their choice based on their own future needs and circumstances as teachers.

As stated in the introduction, previous studies have not conducted systematic and in-depth analyses of student teachers' (or teachers') didactic choices and motivations regarding age in relation to digital competence education. However, they offer a complex range of perspectives that show similarities with the findings of the present study. Particularly salient in the present study was the argument that digital competence education is relevant for older pupils due to the nature of their media use and their capacities, which was also found in studies by Botturi (2019), Gouseti et al. (2023), and Martínez (2021). These studies show that arguments based on media use and capacities, which can be used to exclude younger pupils from digital competence education, exist among both student teachers and teachers in different European countries. However, these are all qualitative studies, and further research is needed to understand how common such perspectives are among teachers and student teachers in different educational contexts.

The present study also shows the existence of didactic choices and motivations not found in previous research. These include student teachers focusing on the youngest pupils based on their own future needs and circumstances, and the idea that focusing on the youngest pupils is important as proactive work is needed before children start using social media. The former choice is evidently more practical than didactical, indicating that younger pupils' development is not always the main concern when developing digital competence education. This further supports the finding that younger pupils are somewhat underprioritized. Accordingly, there is need for further research on how teacher education courses handle age as a didactic dimension. There is also a need for research

on how the youngest pupils in school-age educare and other educational contexts receive access to digital competence education.

The second research question concerned how student teachers' didactic choices and motives regarding pupils' age can be understood within the context of the university course under study. The results show that the open-ended nature of the course assignment gave space for students' own perspectives to emerge. Students constructed their motives for including certain age groups in digital competence education based on a selective reading of the course literature, based on their own experiences and ideas of their own future needs. This open-endedness was productive for the purposes of the present study as the main interest was to gain insight into students' didactic choices and motivations. However, the results also indicate that the lack of an in-depth focus on age as didactic dimension in the university course gave rise to potentially problematic arguments in relation to children's right to digital competence education (European union, 2017; Swedish National Agency for Education, 2022; UN, 2021).

Previous studies on teacher education courses have mainly explored student teachers' views on *what* the important issues to focus on are and *how* they can be taught (Botturi, 2019; Lähdesmäki & Maunula, 2022; Watt, 2019). These studies have not analyzed student teachers' didactic choices related to age in the context of the university courses, probably because this dimension was not prioritized in these teacher education courses. This aspect is only mentioned briefly by Lähdesmäki and Maunula (2022) when discussing student teachers' lack of focus on pupils' development, which they saw as a limitation. Hence, the present study contributes to a better understanding of how teacher education courses can shape student teachers' didactic choices and motivations regarding age as a didactic dimension. Future research could involve collaborative research projects where students, teachers, and teacher educators work together to develop digital competence education for children of different ages.

One important implication of this study is that age as a didactic dimension needs a more in-depth treatment in teacher education courses on digital competence. Further, courses need to provide opportunities for students to critically discuss how to teach digital competence to different groups of children. In this context, teacher educators could draw students' attention to how they engage in *boundary-work* when discussing children's age and encourage them to problematize their

perceptions of children's capacities and children's media use. A more inclusive approach to digital competence education involves highlighting the question of *how* in relation to children's age, that is, how to adapt teaching to different age groups, including younger pupils (for a good example, see Masoumi & Bourbour, 2024). Comenius's (1999 [1632]) and Klafki's (1995) theories on age as a didactic dimension can also be used in teacher education to problematize different perspectives on children. The present study has shown the particular importance of critically discussing views on children's current lives and needs in relation to digital competence education. Without a more in-depth focus on age as a didactic dimension in teacher education, student teachers may proceed to their future work as teachers with a common-sense understanding of children, and in the worst case they may hold stereotypical ideas and misunderstandings. In addition, teacher education needs to highlight relevant policy documents that stress children's right to digital competence education (e.g., European Union, 2017; Swedish National Agency for Education, 2022; UN, 2021). Disregarding children's rights and children's age as a didactic dimension in teacher education could cause children, due to their age, to miss out on important educational opportunities vital for their current and future lives in a digitalized society.

In the context of this study, the ongoing debate in Sweden (and internationally) about the role of digital devices in education is relevant to address. In recent years, a so-called digital backlash has emerged, with increasing criticism of digitalization for its perceived negative impact on education and everyday life (Forsler et al., 2024). The empirical material analyzed in this study was collected before this backlash gained momentum around 2023, when the Swedish government halted the new national digitalization strategy for education (Forsler et al., 2024). Therefore, data collected at a later time might reflect more critical perspectives among student teachers, particularly regarding young children and digital media. However, as stated in the introduction, the university course examined in this study focused not on teaching *with* digital technology but rather on teaching *about* digital competence. It is the former—teaching *with* digital technology and using various digital devices in classrooms—that has been the focal point of the critical debate. It is important not to conflate these two because digital competence is a subject matter in its own right and it can be taught without digital tools, for example, through discussions about media use to promote critical reflection.

## Conclusions

All children have the right to an education that fosters digital competence (European Union, 2017; Swedish National Agency for Education, 2022; UN, 2021), making it essential for teacher education to prepare future educators for this responsibility. The findings of the present study indicate that student teachers often perceive digital competence education as more relevant for older pupils in school-age educare. Such a perception risks excluding younger pupils from valuable educational opportunities. Therefore, teacher education courses on digital competence should emphasize age as a crucial didactic dimension, challenging assumptions about children's capabilities and media use. This dimension is particularly important for future teachers in school-age educare, who will work with a wide range of age groups.

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