Perspectives of Children and Young People on Their Education as Preparation for Their Future in the Digital Age: In-depth Qualitative Study in Five European Countries

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Introduction

The world is changing as all areas of life are becoming increasingly digital. These changes particularly affect children and young people as future custodians of society which means that the education sector has an

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important role to play in preparing children and young people for this future role. Understanding children's and young people's access to and use of digital technologies is an increasingly important area of research, especially if we are to ensure that they can harness the opportunities of digital technologies for their future. Equally, there is a need to recognise that the digital age presents both opportunities and challenges for children and young people (Third et al., 2017). In this context, the future development of education and society in Europe raises the following question:

How do children and young people regard education in terms of preparing them for their future in the digital age?

Now more than ever, digital technology is important to assist children and young people in their education. Yet, access to digital technology is not always equal (Ayllón et al., 2023), leading to the risk that those children and young people who have limited access can be excluded from today's digitalised society (van Dijk, 2020). The ability to use digital technology in education, to assess and structure information, and to be critical digital users is essential for a successful career and hence should be taught from an early age (European Commission et al., 2022). Yet, much of what we know about children's and young people's access to and use of digital technologies is either based on surveys or reported by adults (Hsin et al., 2014). Moreover, views and expectations about what education, and schools in particular, can achieve for the future through digitalisation are both profound and general (Seland et al., 2022). What is often overlooked in the research literature are children's and young people's

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attitudes and views on the use of digital technologies in education, especially in preparing them for their future lives outside of school. This chapter aims to address this omission with a qualitative study that explores children's and young people's perspectives in five selected European countries (Estonia, Germany, Greece, Norway, and Romania) on digital technologies in education and how they view their education in preparing them for their future.

Therefore, the following four focal points serve to answer the question of how children and young people view education in terms of its ability to prepare them for life in the digital age:

- Children's and young people's access to and availability of digital technologies at school and outside the school for school purposes
- Children's and young people's information gathering and evaluation, content creation, and use of digital technologies for interaction and communication at school
- Children's and young people's attitudes towards the use of digital technologies at school, taking into account the most liked and disliked aspects, benefits and challenges, and risks
- Children's and young people's perspectives on their teachers' willingness to teach with and about digital technologies

These focal points are first addressed in a literature review and then to structure the presentation and analysis of the research results.

Literature Review: How Children and Young People Acquire Digital Competences and Use Digital Technologies at School

Contemporary and modern education should aim to equip students not only with knowledge across subjects and disciplines but also with the skills and digital competences needed to navigate an increasingly digital world. There are a variety of frameworks and definitions of digital competences. This concept is often conflated with ICT competences,

computer and information literacy, digital skills, digital literacy, and even digital citizenship (e.g., Aesart et al., 2015; Cortesi et al., 2020; Eickelmann et al., 2019; Fraillon et al., 2020). In the following, we use the term 'digital competences' to refer to 'the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society' (European Commission, 2019, p. 10). These are particularly important given the wide gaps in digital competences between regions and genders, which can affect, among other things, career paths (Braun et al., 2020). To prepare the next generation for an increasingly digital world, schools need to be equipped to meet the challenges of new ways of learning and working in the twenty-first century (European Commission, 2020b). However, there are significant differences within and between education systems in terms of digital competences and readiness for a future life in the digital age (Eickelmann et al., 2019; Fraillon et al., 2020). These differences can be seen in curricula, digital resources, technology use, and digital competence instruction (2nd Survey of Schools: ICT in Education, 2019; Ayllón et al., 2020; Falk & Biagi, 2015).

Access to digital technologies is a prerequisite for their integration into education and for preparing children and young people for a digital future (van Dijk, 2005, 2020). However, access varies across regions and countries, and not only access in school but also access at home can support or hinder readiness. For instance, research by Ayllón et al. (2023) shows that in Romania and Greece, access to computers and the Internet lags far behind countries such as Norway and Estonia, leading to a form of digital deprivation in some European countries. Yet mere access to digital technology is insufficient in preparing children and young people for an increasingly digital future as the competency to use this technology is also crucial. As research shows, there are also significant differences in terms of digital competences between regions and between genders (Braun et al., 2020). In addition to these trends, research has shown that inequalities exist in relation to digital technologies in education (Seland et al., 2022). The COVID-19 pandemic has further highlighted these inequalities and the need to address them when preparing children and young people for a digital future (Eickelmann et al., 2021; European Commission, 2020a).

Addressing these challenges requires a rethinking of education with a focus on preventing educational inequalities and fostering digital education to prepare children and young people for the twenty-first century (Voogt et al., 2013; OECD, 2019, 2020; Ottestad and Gudmundsdottir, 2018). The European Commission's Digital Education Action Plan outlines two core strategies to achieve this goal: developing a high-performing digital education ecosystem and enhancing digital skills and competences for digital transformation. Thus, the Action Plan highlights the importance of connectivity, digital equipment, and teachers who are able and willing to fully exploit the potential of digital technologies as well while also enhancing digital competences (European Commission, 2020a). In this chapter, we aim to shed light on these issues by focusing on children's and young people's own perceptions in terms of access (connectivity), their competence and use of digital technology, their attitudes towards technology, and their perspectives on teachers' willingness to teach with and about digital technology.

While there are also different country-specific frameworks for digital competences,[1] there is a transnational framework for Europe in which five areas for the digital competence of citizens can be found (European Commission et al., 2022):

1. Information and data literacy
2. Communication and collaboration
3. Digital content creation
4. Safety
5. Problem solving

The areas for digital competence (1) Information and data literacy, (2) Communication and collaboration, and (3) Digital content creation refer to the above-mentioned focal point 'Children's and young people's information gathering and evaluation, content creation and use of digital technologies for interaction and communication at school'. These areas are in turn divided into dimensions of competences and are subdivided

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[1] For information on the corresponding frameworks and specifications in the countries Estonia, Germany, Greece, Norway, and Romania, see Eickelmann et al. (2022).

into proficiency levels. At the foundation level of the competence area (3) Digital content creation, learners should be able to 'choose how I express myself through the creation of simple digital means' (European Commission et al., 2022, p. 27) with guidance. At an advanced level, they should be able to 'show ways to express [them]sel[ves] through the creation of digital means' (European Commission et al., 2022, p. 27). At the most advanced and highly specialised level, however, they should 'create solutions to solve complex problems with many interacting factors that are related to content creation and edition in different formats, and self-expression through digital means' (European Commission et al., 2022, p. 27).

Even though no specific age groups are given for the respective proficiency levels, the competence areas are structured in such a way that beginners (or younger and/or inexperienced learners) first start with simple tasks where they need guidance. By contrast, highly advanced (or older and/or experienced learners) should perform the most appropriate tasks in terms of autonomy. In this context, they should be able 'to adapt to others in a complex context' (European Commission et al., 2022, p. 71).

Area (4) Safety refers to the focal point 'Children's and young people's attitudes towards the use of digital technologies at school, taking into account most liked and disliked aspects, benefits and challenges and risks', as risks related to digital technologies and can also include, for instance, Internet safety (Eickelmann et al., 2022), and the adequate handling of such risks is addressed with this competence area (European Commission et al., 2022).

Concerning this focal point in dealing with children's and young people's attitudes, it can be further emphasised that it may be worth considering shifting the focus to children's and young people's perspectives rather than just looking at the issue from a systemic perspective. The literature from the new sociology of childhood emphasises the agency of children and young people and the importance of their voices in informing educational practice (Leonard, 2016; Markström & Halldén, 2008; Qvortrup, 1994; Smith, 2008; Valentine, 2011). Children and young people are no longer seen as passive but rather as competent and active actors not only in their own development but also in the shaping of social relationships (Qvortrup et al., 2009). Children are understood as 'being'

versus 'becoming'. To put it differently, children themselves actively participate as co-constructors in shaping both childhood and society (Qvortrup, 2014). For instance, as children and young people are regular users of new media technologies, some research has shown that they develop wider and more substantial knowledge based on how to use this media than their parents or grandparents (Aarsand, 2007). In our research, we were not only interested in how children and young people actively shape and structure processes around them but, moreover, in the different competences of children and young people at different ages and developmental stages, with a particular interest in their experiences as they relate to technology.

When preparing children and young people for the digital age, it is also important to consider their age-related perspectives. Older children and young people may have different expectations and needs when it comes to digital competences as they have a greater capacity for reflection and critical thinking. The age of children and young people is an important characteristic that influences how they perceive their readiness for the digital age (Davies and Eynon, 2013; Livingstone et al., 2019). Seland et al. (2022) have highlighted that in the research on digital technologies in education, the age of children and young people tends to be used to characterise the sample used for the study but that comparison between different age groups is rarely a main analytical point in the studies.

Moreover, according to Scherer et al. (2017), the use of digital technologies depends on the contexts, cultures, and specific purposes for which it is used. The European Union has also emphasised the importance of considering the role of students in shaping digital education. Therefore, a more differentiated, person-centred perspective is needed to describe how specific groups of students use digital technologies for different purposes and in different contexts (Scherer et al., 2017). We aim to take up this challenge by focusing on students' perspectives on how they are using digital technologies and for what purposes.

Methodology: A Qualitative Interview Study with 9- to 16-Year-Old Children and Young People in Five Countries

To answer the research question on how children and young people regard education in terms of preparing them for their future in the digital age, we conducted a qualitative interview study with children and young people between the ages of 9 and 16 in five European countries (Estonia, Germany, Greece, Norway, and Romania) with varying levels of information and communications technology (ICT) infrastructure. The start of our fieldwork coincided with the outbreak of the COVID-19 pandemic and the restrictive measures imposed by governments, which posed recruitment challenges due to limited access and parental reluctance to allow their children's participation. Despite these setbacks, each country team did manage to recruit a sufficient and relevant sample of children and young people in each country. Nevertheless, the pandemic had a positive impact by making the issues examined in our research relevant to the educational realities that many children and young people faced due to global lockdowns. The extensive use of distance learning methods enabled participants to provide experience-based views on the use of digital technologies in the school environment. Table 1 shows the composition of the sample, which was designed to ensure heterogeneity in terms of gender, migration background, socio-economic background, and age.

Table 1 Composition of the children and young people sample

Country	No. of children and young people	Age range	Gender		Migration background		Socio-economic status		
			Female	Male	Yes	No	High	Middle	Low
Estonia	8	15–16	4	4	–	8	2	4	2
Germany	10	9–10	5	5	2	7	5	2	3
Greece	6	12–13	3	3	–	6	1	5	–
Norway	11	12–13	3	8	–	11	6	5	–
Romania	8	10–12	6	2	–	8	4	4	–
Total	43	9–16	21	22	2	29	18	20	5

The table shows that the youngest children (9–10 years old) came from Germany followed by the 10- to 12-year-old children and young people from Romania and the 12- to 13-year-old children and young people from Greece and Norway. The young people who are 15–16 years old were from Estonia. Care was also taken to ensure that the sample was diverse in terms of gender migration background and socio-economic status. While a total of eight students were initially interviewed in Estonia only six of them who completed two interviews were included in the final analysis for this chapter.

The interviews were conducted with the same respondents twice—in spring/summer 2021 (first data collection period) and in autumn/winter 2021 (second data collection period). The interviews conducted by the researchers were based on a cross-nationally developed guideline (Eickelmann et al., 2022). Both interviews were used for the current chapter.

After the data collection was completed, the data were transcribed into the local language in each country. A qualitative content analysis was applied (Mayring, 2014), supported by the use of NVivo. A common category system was developed using a deductive approach based on the interview guides (Creswell, 2013). The content of the categories was then translated into English. Based on this, a cross-case country comparative analysis was carried out to be able to compare the results of the individual cases with each other but also country-wise as the samples are assigned to different age groups.

How Children and Young People Acquire Digital Competences and Use Digital Technologies at School

The findings in this section address the overarching research question of how children and young people view their education in terms of preparing them for their future in the digital age. In this context, several general categories emerged from the analysis: (1) children's and young people's access to and the availability of hardware and software at school and

outside the school for school purposes; (2) children's and young people's information gathering and evaluation, content creation, and use of digital technologies for interaction and communication at school (i.e. competence); (3) children's and young people's attitudes towards the use of digital technologies at school, taking into account opportunities, challenges, and risks; and (4) children's and young people's perspectives on their teachers' willingness to teach with and about digital technologies. The results are reported according to the four general categories, starting with the youngest age group of children and young people from Germany.

(1) Children's and young people's access to and the availability of digital technologies at school and outside the school for school purposes

The data show that children and young people aged 9 to 10 from Germany reported having access to and availability of smartboards, followed by desktop computers and then tablets at school. Yet outside of school, mobile digital technologies seemed to be more common, such as tablets, followed by mobile phones and laptops:

> Actually, we don't use that many digital devices. At most, a lot of children use the computer during free work […]. Sometimes we use tablets. […] But we only have 6-7 tablets in class […]. We have a digital whiteboard and a normal blackboard, but the digital whiteboard doesn't work […]. The smartboard is rarely used. We also have a beamer, but it is already broken and needs to be repaired (Germany, age group 9-10).

In terms of access to and the availability of software at school, only a few of our informants talked about this, mainly referring to learning applications: 'Anton and Duolingo exist. Then there are other apps where you can do maths' (Germany, age group 9–10). Regarding access to and the availability of software outside school, some of the 9- to 10-year-old children and young people from Germany mentioned video platforms (e.g., their school website, IServ). In Romania, almost all of the 10- to 12-year-old children and young people interviewed reported limited access to hardware, and the majority reported that only one device is available for the use of the teacher. Outside of school, mobile phones appeared to be the main tool used, followed by tablets. In addition, the children and young people from Romania reported having no access to the software at

school. As to access to and the availability of software outside school, video conferencing tools, such as 'AdServio and DexOnline. And also […] Zoom' (Romania, age group 10–12), were reported as being accessible.

As reported above, the interviewed children from both Greece and Norway were 12–13 years of age. The children and young people in Greece reported having access to and the availability of laptops and desktop computers at school; other hardware, such as a TV, is only explicitly mentioned by a few: 'We have TV sets, one in each classroom. And a laptop, which usually belongs to the teacher. The TV set is permanently in the classroom, and we use it to have interactive lessons' (Greece, age group 12–13). Norwegian 12- to 13-year-old children and young people most frequently mentioned access to and the availability of desktop computers, laptops, and Chromebooks at school, followed by tablets: 'We have a set of Macs and one set of Microsoft, stuff like that. But they're like that in a Mac closet and then teachers can hand out a PC and we'll use it throughout the day. Then we'll return to the closet' (Norway, age group 12–13). Outside school, mobile phones were the tool of choice for 12- to 13-year-old children and young people from Greece, followed by laptops. A small proportion of the 12- to 13-year-old children and young people from Norway that we spoke with reported having access to and the availability of laptops, and some had desktop computers (mainly those who were gamers) along with mobile phones at home. When it comes to access to and the availability of software at school, there were only a few responses from 12- to 13-year-old children and young people from Greece, mainly on learning applications, 'where you write prompts and it shows them' (Greece, age group 12–13), video conferencing tools (e.g., Webex and e-class), and presentation software: 'We do a lot of PowerPoint presentations, or the teacher does; in every class, he is doing a presentation' (Greece, age group 12–13). In Norway, some of those interviewed mentioned the use of office applications and collaboration platforms:

> We use Word and PowerPoint and then we have used Excel a bit … then we often search YouTube. (Norway, age group 12–13)

As long as I have Teams, I can access everything. I can access my files on OneDrive as long as I have Office. It's Google, so I never need anything more than Teams and Google, which I can do from my mobile, iPad, pc, because … everything can be found online. (Norway, age group 12–13)

In Estonia, 15- to 16-year-old young people reported that mainly accessible and available at school are mobile phones, desktop computers, and laptops. Outside school, these young people mentioned mobile phones, desktop computers, and laptops as items they have access to and use. In addition, the learning management systems they mentioned include e-School, Studium, Google Class, Quizlet (or Quiz), and Opiq. They also reported collaboration platforms such as Zoom, Teams, Discord, Google Docs, Google Slides, and Google Drive as accessible at school. Outside school for school purposes, they often use learning management systems.

The children and young people we spoke with across the five countries do have access to digital technology and software in school, and some even have access to several types of devices (mobile phones, tablets, desktop computers, and tablets) outside of school. Yet, it is clear that there is a range of digital tools and software available. Some of our respondents have one-to-one availability to digital devices (i.e., Estonia and Norway), while others have limited availability (i.e., Germany, Greece, and Romania), and, in some cases, only teachers have these digital devices (Greece and Romania). Outside of school, mobile phones are a useful tool for children and young people in all five countries regardless of age. Our data also show a wide range of software and platforms that are being used in education across these five European countries, with Google, Zoom, YouTube, and Office applications being the most mentioned.

(2) Children's and young people's information gathering and evaluation, content creation, and use of digital technologies for interaction and communication at school

In Germany, 9- to 10-year-old children and young people talked about collecting and evaluating information at school mainly when they 'have to research something' (Germany, age group 9–10) for different lessons, such as German lessons or science. This usually involves Internet research via mostly child-friendly search engines (e.g., fragFINN or Blinde Kuh)

in preparation for presentations or information summaries. The 10- to 12-year-old children and young people from Romania gave little or no information on this topic. This is of course not surprising given that they have reported limited access to digital technology in general, both inside and outside of school.

The 12- to 13-year-old children and young people from Greece reported using presentation software and Word as tools for writing and working with information: 'The most helpful application is Word, because there we prepare most of our homework, like writing, presentations, etc. And all Microsoft programmes in general' (Greece, age group 12–13). For these children and young people, Word was used to create content, but we had little insight into where they collect information from or how it is being evaluated. Our data from Norway do show how some children and young people reported collecting and evaluating information for research purposes:

> Maybe we mainly use Google the most. Searching for information in subjects such as KRLE [religion and ethics] and social studies, if I get homework there. And then we're going to have something like that about timelines or things like that … Then I search on Google or something, but then I might quickly click into a YouTube video about the timeline from that and that year and stuff. (Norway, age group 12–13)

This example shows how children are learning to navigate several different types of information, and in doing so, they can build on the information they are collecting. The 15- to 16-year-old young people from Estonia said that they collect and evaluate information at school mainly for research purposes and to check homework and assignments:

> The Internet is like a second teacher in current times, so if there is a question you do not know the answer to, and your friends also don't know, then you'll google and for sure find the answer. (Estonia, age group 15–16)

> During school hours or after school, I check e-School [a school management tool] to see what I need to learn or what needs to be done. (Estonia, age group 15–16)

In addition to the children from Greece who use Microsoft applications to create presentations, the children from Norway elaborated on their use of these same applications and other applications for content creation in school—'Then we use such things like PowerPoint if we are going to make presentations, and we use Word to create texts, if we are going to create texts. Or sometimes we use Minecraft Education if we're going to make things, build things and stuff like that, yes' (Norway, age group 12–13)—and the 15- to 16-year-old respondents from Estonia: 'I just remembered that once we did in the literature class [...] some kind of drawing somewhere on the Internet and I really liked it' (Estonia, age group 15–16). Thus, content creation for children and young people is mainly to develop digital presentations and assignments.

The use of digital technologies in school by children and young people for interaction and communication (e.g., Teams, Zoom, Snapchat, WhatsApp) was most common among the 9- to 10-year-old children and young people in Germany, but also the 10- to 12-year-old children and young people interviewed in Romania reported some use. Some of the 12- to 13-year-old children and young people from Greece said that there is no communication with teachers outside school. The 12- to 13-year-old children and young people from Norway mentioned the use of digital technologies in school for interaction and communication most often to get information and materials and to communicate with teachers: 'Hmm… It is, perhaps, It's Learning [an educational management platform used by many schools in Norway]. [...] Because it's eh, it's pretty important to get messages. [...] we get messages at It's learning and it's a bit more like that, we can see what's going on' (Norway, age group 12–13). The 15- to 16-year-old young people from Estonia often interact and communicate outside of school with classmates about their homework or with their class teachers via Discord, Google Docs, emails, and Teams: 'Class teacher sometimes asks in Messenger like: oh, how are you, how are you all?' (Estonia, age group 15–16).

The children and young people in Germany, Romania, Greece, Norway, and Estonia show different patterns of information gathering and evaluation. Children and young people from Germany (9–10 years) mainly use child-friendly search engines for school research. Those from Romania (10–12 years), with limited access to digital technology,

provided minimal information. The children and young people from Greece (12–13 years) reported using presentation software and Word, but details on sources and evaluation were scarce. Those from Norway (12–13 years) navigate and evaluate information using Google, YouTube, and so on. Estonian young people (15–16 years) collect and evaluate information through an e-school platform. Content creation is prominent in Greece, Norway, and Estonia, using Microsoft applications and others, such as Minecraft Education. Digital technologies for interaction and communication varied between age groups and countries, with children and young people from Germany aged 9–10 being the most active users, while children and young people from Greece aged 12–13 reported limited communication with teachers. The Norwegian children and young people of the same age and the Estonian 15- to 16-year-olds emphasised the use of digital technologies to obtain information and materials and to communicate with teachers.

(3) Children's and young people's attitudes towards the use of digital technologies at school taking into account the most liked and disliked aspects, benefits, challenges, and risks

In relation to children's and young people's attitudes towards the use of digital technologies in education, we asked them to reflect upon the things they liked and disliked the most.

For 9- to 10-year-old children and young people from Germany, games, having fun, and the search function were mentioned as the most important features:

> Well, I think it's very, very good. I have a lot of fun with the iPads. Especially because we are allowed to move around quite freely on the iPads. And sometimes we do a bit of research. We're supposed to Google something or other. That also helps us in class from time to time […]. Playing games is my favourite thing. Because there are also games on the platform. But you have to collect coins to play games. For example, you can write things with 'ie' on the platform. That's digital, you have to answer a question and when you've done that, you usually get a coin. And then there is also a test that you can take if you want. It's particularly difficult and you usually get two coins for it […]. I think it's very cool when you can do maths on the computer. Not this writing on the computer, but when you have to type one of

three answers. That's very, very much fun for me and I also like it very, very much. (Germany, age group 9-10)

For this child, digital technology means having fun while also learning. In contrast, some children talked about technology and health issues as the most disliked aspects: 'If a learning app on the mobile phone doesn't work, but then takes a long time to load, load, load, that annoys me' (Germany, age group 9–10). Also, for some of the children and young people from Romania, the use of digital technologies can mean problems with concentration and health: 'We can ruin our eyes because we spend time on the phone or they are not very healthy to spend time on because we could very well read a book instead of sitting and playing' (Romania, age group 10–12). 'We can spoil our eyes and stop writing so nicely by hand if we sit too long on tablets and phones' (Romania, age group 10–12).

The 12- to 13-year-old children and young people from Greece and Norway pointed out that the use of digital technologies is helpful in teaching and learning but that in some cases, it can lead to distraction:

> The Internet is much easier but at the same time it distracts you, you are thinking of opening a new tab and doing what you wanted there. Or to deal with both things at the same time where it is not right while with the book you concentrate more and it is more organized to say it, you know that there is a book, and it is not something irregular on the Internet. You have a book in your library, you can open it wherever you want and without Internet, electricity, etc. and everything else. You open it and read. (Greece, age group 12-13)

> I generally believe that in all classes the use of the computer could help more, and the students could understand better. I don't have a specific course coming to my mind. But I generally believe it is useful for all of them. ICT and the Internet help a lot to learn new things. (Greece, age group 12–13)

In Greece, hardly any disliked aspects were mentioned except that they do not like having to be careful because there are risks such as viruses. In Norway, the main concern was stated as disruption from others:

> Yes. And then, we're kind of a stubborn class and the boys are a little bit of troublemakers. When you come up with something like gaming or scratch in the back of the class, all the boys come and then all of a sudden, it's just chaos. The girls are trying to be a little calmer in class, being someone who has some understanding, a little empathy in that class, and a little brain. But the teacher has a slight headache sometimes. But they'll just have to have that. (Norway, age group 12–13)

The Estonian 15- to 16-year-old young people particularly liked the fact that digital technologies make their work easier, and their most disliked aspect was technical problems:

> Comfort. Comfort, it's just as interesting or like […] they somehow diversify [learning]. And it is much more comfortable to write an essay in Docs or to do slide-presentation, it is much easier, more comfortable, and faster. (Estonia, age group 15–16)

> Well, it doesn't work half the time. Our school's webpage, where you should see subjects and homework, just doesn't work half the time. (Estonia, age group 15–16)

In terms of risks and threats, the different research teams asked the children and young people to think about these, particularly any dangers related to education and the use of ICT.

Some of the 9- to 10-year-old children and young people from Germany saw malware as a danger: 'The mother of one of our classmates was on the laptop the other day and it had a virus so we are not allowed to touch it now' (Germany, age group 9–10). They also said that they are aware of the risks. Concerning education about the risks of ICT use in the school context, only a few of them reported that there was an education about Internet safety: 'Yes, about the Internet actually, that it is also very dangerous. We talked about that once, but otherwise not quite so much' (Germany, age group 9–10). The 10 to 12-year-old children and young people from Romania mentioned a lack of Internet safety and the harmful effects on health (of the eyes) as risks:

Yes, we talked last year, but I don't remember what it was all about. I think viruses and hacked accounts? (Romania, age group 10–12).

Yes. We can ruin our eyes because we spend time on the phone or they are not very healthy to spend time on because we could very well read a book instead of sitting and playing. (Romania, age group 10–12)

However, these same children hardly mentioned any educational risks when using ICT in school. In Greece, 12- to 13-year-old children and young people said that the dangers of ICT use are discussed by teachers:

If you are careful, there is no danger […]. I had discussed dangers with my parents some time ago and in school recently, some experts visited us, and they talked with us about it. And also, the ICT teacher repeated most of it in her class. (Greece, age group 12–13)

Yes, we recently had a visit from 2 ladies who spoke to us first about the dangers of the Internet and then about its use. Mostly we do not discuss it with our teachers, but some people come twice a year to talk to us about the Internet, the dangers, what are the appropriate terms to use so as not to create a problem with us. (Greece, age group 12–13)

Yes, we have talked about the Internet and how dangerous it can be. We have discussed it in various classes (Greece, age group 12–13).

In Norway, the interviewed children and young people mentioned this topic with a focus on being careful:

We've all learned to be careful then, and so… Yes, from my father, I've learned how to make good passwords and then we've had a little bit like that and stuff like that at school. (Norway, age group 12–13)

We usually try to stay away from sources, and websites that the teacher says we are not allowed to use. But then there's the kind of system thing that keeps track of what we're looking for in a way. So, some things are a little limited. I don't know much about it because it's the IT people who do it. They can't control very much what we do other than that we somehow

don't download games, buy lots of stuff, and stuff like that. (Norway, age group 12–13)

Some of the 15- to 16-year-old young people from Estonia mentioned malware as a danger, and concerning education about the dangers of ICT use in the school context, the majority of them said that the risks of the Internet are well known and that there is no need for education on it:

> I have this experience and I have, if I need, I download this trash, but I know how to download it in a way, that wouldn't be dangerous. And if it is dangerous, then I at least know what to do […]. I am quite sure that this has been talked about already in primary classes. I know that a lot is talked about when computers are first used in the classes, that don't download some trash and don't click on some unknown links, etc. […]. I think it has been talked about so much, and at 16 years old, I don't believe that you are quite as stupid that you somehow, well, accidentally it happens, but on purpose, you do not click on those links. (Estonia, age group 15–16)

In addition, they said that they see concentration and attention problems as the most challenging aspects of ICT use as well as technical problems:

> Well, the only problem I've really had is that the printer doesn't want to print sometimes. (Estonia, age group 15–16)

> There are a lot of these so-called slip places on the Internet, where you just drift to another page […] it's really hard to stay focused actually, it's really hard to change it actually. (Estonia, age group 15–16)

Looking at the main potentials of ICT use by children and young people, some benefits emerge.

The 9- to 10-year-old children and young people from Germany and the 10- to 12-year-old children and young people from Romania indicated the availability of online information as a benefit. While the 12- to 13-year-old children and young people from Greece and Norway reported usefulness as a benefit, those from Norway also saw benefits in the fact that ICT use makes learning easier and in the availability of online information:

I like it [ICT use in school]. I generally like to use computers; they make things a little bit easier. (Greece, age group 12–13)

The best thing [in using ICT for school] is that you save time and space, and there are some very nice things, mostly clever things like shortcuts. (Greece, age group 12–13)

There is so much online that you can get answers to, or there is so much you can get answers online that teachers can't answer you. And then I think it's okay to use newer sources than our book because it's from 2007. It's very straightforward to use the Internet to find newer maps and stuff. (Norway, age group 12–13)

Writing assignments using Word is useful and it makes it much easier to get written faster. It's kind of proofreading like that, so you kind of get a little more meaning in the words you write. Digital technology also makes it easier to keep track of assignments because we use Teams to hand in assignments or get assignments in our class and notebook, which makes it much easier to keep track of the whole class all day and know what to do. (Norway, age group 12–13)

The 15- to 16-year-old young people from Estonia said that the use of digital technologies is 'very comfortable' (Estonia, age group 15–16), useful, and makes learning more interesting.

Overall, different preferences and concerns emerged in different age groups and countries. For the children and young people from Germany (9–10 years), games, fun, and the search function were the most important features, while technical issues and health concerns, such as eye strain, were their main dislikes. Similarly, Romanian children and young people (10–12 years) were concerned about health and concentration problems caused by excessive use of technology. The 12- to 13-year-olds from Greece appreciated the ease of use of the Internet but also emphasised the importance of concentration and organisation offered by traditional books. The Norwegian students emphasised the convenience and availability of online information and the use of digital tools for assignments. The Estonian 15- to 16-year-olds found digital technologies convenient and time-saving. However, they also mentioned technical

problems as a significant drawback. In terms of risks, the children and young people from Germany mentioned malware as a concern, while those from Romania discussed Internet safety and health effects. The children and young people from Greece reported discussions about Internet dangers and appropriate use at school, while the Norwegian students focused on being cautious and avoiding restricted websites. The Estonian young people mentioned malware as a potential risk but felt that education about Internet dangers is not necessary for their age group.

(4) Children's and young people's perspectives on their teachers' willingness to teach with and about digital technologies

Regarding teachers' willingness to teach with and about digital technologies, the children and young people mentioned differences between teachers, including in terms of their digital competence and the frequency of ICT use in the classroom.

The 9- to 10-year-old children and young people from Germany mentioned subject-related and age-related differences in teaching with and about digital technologies, but overall, they tended to describe their teachers as competent:

> With the maths teacher, I think she prefers to write on the blackboard. On the regular board, not on the smartboard, but on the blackboard. (Germany, age group 9–10)

> The older teachers don't enjoy using digital devices, but the younger ones do because they already know it works. (Germany, age group 9–10)

> I think they just like it too. Our teacher told us that when she started studying, the Internet didn't exist yet. Digital research didn't exist then. There were mobile phones or telephones or something, but she had to learn it all over again. But she copes very, very well with it. (Germany, age group 9–10)

In addition, some of them reported frequent use of digital technologies in class, while others reported infrequent use, once a week or less. Similarly, the 10- to 12-year-old children and young people from Romania stated that there are differences between their teachers in

teaching with or about digital technologies: 'The older teachers, who came in more, so, they have maybe better books, I don't know … they don't like technology' (Romania, age group 10–12). They tended to describe their teachers as competent, but there was little information about the frequency of ICT use in the classroom. While the 12- to 13-year-old children and young people in Greece mainly mentioned age-related differences and differences in experience and familiarity, those in Norway did not comment much on possible differences between teachers in terms of their readiness:

> It depends on the age and the interests of the teachers. In some courses, like the theoretical ones, like history and geography, it is much easier for me, because we have maps. If something is missing on this map, we can search on Google. (Greece, age group 12–13)

> Now, for the new technologies, I think that they avoid them because we had this discussion in the classroom. No teacher liked distance learning, but it was worse for the older ones. I happen to have a gymnastics teacher who is over 50 years old, and we missed too much from our time in the class because she didn't know how to connect. (Greece, age group 12–13)

> Teachers ask students for help quite often, especially if something sticks or something like that, and if you can't get into the page or are going to search for something or … yes, find gadgets. We have quite a few computer experts in class. (Norway, age group 12–13)

Regarding the frequency of use of digital technologies in class, the 12- to 13-year-old children and young people in Greece mainly reported frequent use, while in Norway and Romania, there was little information on this subject.

The 15- to 16-year-old young people from Estonia mainly reported that there are age and subject differences between teachers when teaching with or about digital technologies. However, they mainly reported frequent use of digital technologies in the classroom:

> Younger people know how to use more computers and different environments […]. If there is a need to show something, then the younger teachers

manage to do it better. For example, when they want to show some assignment or website, then screen sharing is not as difficult as it is for older teachers. (Estonia, age group 15–16)

Overall, the children and young people from Germany, aged 9–10, mentioned differences between teachers in terms of their digital competence and the frequency of ICT use in the classroom. They described their teachers as competent overall, with some preferring traditional methods and others using digital devices. Similarly, the children and young people from Romania aged 10–12 said that there are differences between their teachers when teaching with or about digital technologies. They tended to perceive their teachers as competent, but there was little information on the frequency of ICT use in the classroom. In Greece, the children and young people aged 12–13 mentioned mainly age differences and differences in teachers' experience and familiarity. In Norway, they mentioned that teachers often ask students for help with digital tasks, while in Greece, frequent use of digital technologies in the classroom was reported. There was limited information on the frequency of ICT use in Norway and Romania. The 15- to 16-year-olds from Estonia reported age and subject differences between teachers when it comes to teaching with or about digital technologies. Younger teachers were considered to be more proficient in using computers and sharing screens. They also reported frequent use of digital technologies in the classroom.

Discussion: How Children and Young People Acquire Digital Competences and Use Digital Technologies at School

In terms of the availability of and access to digital technologies in schools, which is certainly strongly linked to the resources and circumstances of the education system or even the individual school, for the youngest children in our sample (from Germany), it appears that smartboards are mainly used. Desktop computers and tablets are used at school by all age groups (if access is available), but access to mobile phones, for example,

was reported more by older young people (in Estonia). As shown by Ayllón et al. (2023), access to computers and the Internet in Romania is limited and can help explain why some children in Romania reported no or limited access. However, limited access can be challenging for children in Romania as it can affect their ability to develop sufficient digital competence. If they are not given opportunities to learn how to gather and evaluate information, create digital content, and use digital technologies for interaction and communication, this can have long-term effects on their future possibilities beyond education. For Greece, Ayllón et al. (2023) also point to a form of digital deprivation compared to countries such as Norway or Estonia, where access does not seem to be problematic. This is supported by our results.

In terms of the use of digital technologies for interaction and communication, video platforms or videoconferencing tools are used by all age groups. However, the 12- to 13-year-old children and young people in Norway and the 15- to 16-year-old young people in Estonia also reported using collaboration platforms outside of school, and the older Estonian young people also use learning management systems. Another result is that younger children interact and communicate via digital technologies more for exchanging information, while older children and young people (in Estonia) also use learning management systems to interact and communicate. This is also in line with the European digital competence framework, where the competence area (2) Communication and collaboration also mentions the use of different digital tools for collaborative processes, ranging from simple to complex tools. The use of learning management systems and quiz applications (as indicated by the older children in Estonia) would be classified as more complex here (cf. European Commission et al., 2022).

Overall, there is a tendency for younger children to work with simpler resources and older ones with more complex ones (cf. European Commission et al., 2022). What remains unexplained but should certainly be reflected on in the future is whether the differences are more due to the country-specific conditions, whether they are more age-related, or whether the use of digital technologies at school corresponds exactly to the needs of the children and young people in their respective age group. For instance, the results show that content creation is more of an issue for

older children and young people (in Greece, Norway, and Estonia). What should not be concluded from this is that content creation is only something for older children and young people (or is used more in schools in Greece, Norway, and Estonia). Rather, the question should be raised as to whether more content creation should be used in earlier grades, as envisaged in various cross-national plans such as the European framework for digital competences (European Commission et al., 2022).

In terms of possible risks and threats to children's and young people's use of digital technologies in schools, similar risks were mentioned in the different age groups, such as malware, health issues, and technical issues. However, the slightly older participants from Estonia consider these risks to be well-known and therefore see no need to address them more in education. Regarding the perception of how well their teachers can handle digital technologies at school, the slightly older participants from Estonia were more critical than the (younger) children and young people in Germany and Romania, who described their teachers as competent in the use of digital technologies.

Conclusion on Children's and Young People's Perspectives on Education Preparing Them for Their Future in the Digital Age

Addressing the research question of how children and young people view education in terms of preparing them for their future in the digital age, it became clear that the situations regarding the availability of and access to digital technologies that the children and young people find in school and their attitudes towards the use of digital technologies at school differ between the different age groups in the various countries. This became particularly clear through the inclusion of the voices of children and young people. To reduce educational inequalities (OECD, 2019, 2020; Ottestad & Gudmundsdottir, 2018; Voogt et al., 2013), it is important to integrate the perspectives of children and young people, in particular of different age groups, which is often not considered in studies (Seland et al., 2022).

It is important to consider the perspectives of children and young people and different age groups as their needs, preferences, and concerns differ. By using a child- and youth-centred approach, this research contributes to the further development of perspectives that give agency to children and young people, who are seen as 'active, creative social agents who produce their own unique children's cultures while at the same time contributing to the production of adult societies' (Corsaro, 2005, p. 3). The results of our research highlight the need for a differentiated approach to the design of education and technology environments to meet diverse needs and ensure inclusive education. By including the opinions and experiences of children and young people, we can better understand how digital technologies should be used in education and how we can ensure that all age groups benefit equally.

Limitations of the Present Study

The present study has certain limitations that need to be acknowledged. First, direct reference should be made to the previous section: country-specific, but also age-specific, differences can be observed in how children and young people feel prepared by education for their future lives in the digital age. As these results are based on data from a qualitative study, they cannot be generalised. It is also not possible to conclude whether the differences observed are due to the age of the children and young people. There may be other factors at the country or school levels that influence students' perceptions of the role of education in preparing them for the digital age. Second, although the sample size is not large, it is considered sufficient for a qualitative study using in-depth interviews. Furthermore, it is important to consider that conducting interviews via Zoom may result in a different interpersonal dynamic between students and interviewers than in face-to-face interviews. This difference could affect the validity of the study's findings, and it is important to take this into account when interpreting the results. Despite these limitations, this study provides valuable insights into children's and young people's perspectives on their education as preparation for their future in the digital age.

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