A Transnational Comparative Study of Teachers' Experiences of Remote Teaching and Learning During COVID-19 Pandemic

Satu-Maarit Korte
University of Lapland, Finland

Minna Körkkö
University of Oulu, Finland

Outi Kyrö-Ämmälä
University of Lapland, Finland

Miia Hast
University of Lapland, Finland

Sanna Mommo
University of Lapland, Finland

Merja Paksuniemi
University of Lapland, Finland

Gregor Maxwell
UiT Arctic University of Norway

Mhairi Beaton
Leeds Beckett University

Pigga Keskitalo
University of Lapland, Finland

This article presents the findings of an international comparative multiple-case study that examined the sudden change from classroom to remote online teaching during the COVID-19 pandemic. The study specifically explored the experiences of teachers in Northern Finland, England, and Norway, seeking to provide new information about the education situation and identify the focus areas to guide the education of future teachers. The data were collected in three different ways in three different contexts: via an online survey of in-service teachers in Lapland, Finland (N = 164), and through different semi-structured interviews with teachers in England (N = 20) and northern Norway (N = 30). The data analysis was conducted in two phases. The first phase focused on teachers' experiences in teaching and learning and the second phase on teachers' challenges. The results reflect teachers' desire for additional education on online pedagogy, as well as the significance of teacher collaboration and knowledge sharing.

The findings can be used to develop pre- and in-service teacher education, supporting the dynamic digitization of teacher education programs and policies. We recommend that strategies should be developed for how such programs can strengthen future teachers' interaction, collaboration, and knowledge sharing.

Keywords: online pedagogy, remote teaching, teacher education.

Introduction

The global lockdowns during the COVID-19 pandemic impacted everyone's lives. This comparative study examines the experiences, especially teachers' perceptions and challenges, in Finland, England and Norway during the global pandemic. The aim of the study reported in this article was to contribute to knowledge about the competencies required by educators to effectively respond to societal challenges through education provision which has fundamentally altered following increased utilization of the affordances of the digital. The authors expected that a cross-case comparison would permit the authors to answer to the following research question: Based on the experiences of teachers during the pandemic, how could pre- and in-service teacher education be developed?

Globally, schools and other educational institutions from primary to adult education closed their doors and transferred to remote teaching or favored hybrid teaching (UNESCO, 2021, 2022). The school closures have left an indelible mark and had long-lasting effects on educational systems, students' learning, and teachers' approaches. The greatest disadvantage of remote teaching was that it widened learning gaps between students. According to the UNESCO and Global Education Monitoring Report (2021), the pandemic aggravated educational inequalities by disproportionally affecting the learning possibilities of the most vulnerable groups, including girls, refugees, persons with disabilities, and forcibly displaced persons living in poor or rural areas. While some students seemed to benefit from learning remotely during the lockdowns, others needed face-to-face in-person interaction with their teachers and more robust personal guidance (Korte et al., 2022; UNESCO IBE 2020; UNESCO, 2021). According to the UNESCO Institute for Statistics (UIS) (2021) assessment, by November 2020, children had lost out on 54 percent of their yearly contact teaching time, which means over a year's learning was lost on average. Remote teaching put schools, students, and teachers in an unequal position because some schools and homes, especially those in lower socioeconomic areas, lacked the necessary infrastructure and internet connection to cope with remote learning (UN, 2020). Moreover, teachers were not adequately trained to teach remotely or in a hybrid form, even though the situation varied greatly between and within countries (UNESCO, 2021). Meanwhile, many students lacked the necessary Information and Communication Technology (ICT) skills (UN, 2020).

In addition to the academic implications, the period of remote teaching was detrimental to many students' social and emotional well-being because real-time teaching and interaction with peers and teachers were minimized (UNESCO IUS, 2021). School closures also meant students could not access all health and psychosocial services provided by their schools (UN, 2020). Moreover, in some countries, the provision of free

school lunches was problematic at first and needed new arrangements (UNESCO, 2021, 2022). Since the shift to remote teaching was rapid, this period was stressful for the majority of teaching and guidance staff as well as managers in the education sector (Korte et al., 2022; UNESCO, 2021; 2022). The most drastic change for children during remote teaching was the exponential increase in study time in digital environments, which isolated them from their peers, while families took on activities often handled by schools, such as setting up learning spaces, highlighting the socioeconomic differences between homes (Jæger & Blaabæk, 2020).

Educational sectors worldwide must prepare for possible future global crises, which may be managed by applying the lessons learned from COVID-19. Teacher education should equip teachers not only for society's current demands but also for future needs and challenges they will face in their workplace, including mental health and other societal pressure. This reflects how teaching can be a multifaceted, challenging profession that requires broad expertise developed throughout one's career. As Hattie (2009) stated, the ultimate aim of a teacher's learning process is to develop skills and knowledge that make a difference in the classroom and enhance students' achievement. When the classroom was taken away in 2020, according to numerous studies (e.g., Beardsley et al., 2021; König et al., 2020; Perifanou et al., 2021), there were parallels between instructors' remote teaching experiences around the world. The objective of education is usually to guarantee that all groups of people, regardless of their difficulties, have access to equal educational rights, which is achieved in different ways in different schools and communities (Parmigiani et al., 2020). During pandemic lockdowns, delivering effective education proved particularly challenging (Page et al., 2021). Florian and Camedda (2020) noted that teachers were concerned about their lack of effective preparation for working in diverse classrooms. Many educators faced remote instruction implementation challenges, along with difficulties in promoting learning engagement and motivation during fully remote instruction (Abdel Latif, 2022).

On a positive note, remote instruction improved teachers' proficiency to use digital technologies for teaching (Beardsley et al., 2021) and with positive student learning outcomes (Khoirudin, Ashadi, & Masykuri, 2021). National governments worldwide responded to the situation quickly, providing guidance and support for teachers and students. The crisis led to educational innovations and highlighted the importance of the educational sector, especially teachers' essential role in ensuring the continuity of education during critical times. However, previous research on the COVID-19 scenario mainly focused on a single national context, such as Finland (Korte et al., 2022); comparative approaches examining different pedagogical experiences remain rare. This research is a multiple-case study in which the three case studies are analyzed first independently and then comparatively. We expected that a cross-case comparison would shed light on how pre- and in-service teacher education should be developed based on the teachers' experiences.

The data collection strategies differed in the three countries. In Finland, Satu-Maarit Korte, Minna Körkkö, Miia Hast, Sanna Mommo, Merja Paksuniemi, and Pigga Keskitalo developed and implemented a survey (summer and fall 2020) that provided data on teachers' remote teaching experiences and remote teaching competence during the early phase of the COVID-19 pandemic in northern Finland. In England, Mhairi

Beaton carried out qualitative semi-structured interviews with teachers focusing on children's voices and storytelling in summer 2020. In Norway, Gregor Maxwell conducted qualitative semi-structured interviews with newly qualified teachers in fall 2020. The case-study method enabled us to combine results from three countries and compare them according to the research questions and draw final conclusions (Yin, 2018).

This comparative study contributes to the research on online pedagogy, remote teaching, and teacher education by examining experiences, especially teachers' perceptions and challenges, in three countries in the North European context, during the global pandemic. This contributes to our understanding of the unique crisis the COVID-19 pandemic created for education, which is particularly relevant for designing future teacher education, both pre- and in-service.

Background
Operating Contexts in Finland, England, and Norway
Since the 1970s in Finland, compulsory education reforms have aimed to ensure equal treatment for all children. Nowadays, pre-primary education and compulsory schooling (primary, junior high, and high school) are provided for children and young people aged 6–18 (Oppivelvollisuuslaki 1214/2020). Following basic education, students can choose either vocational or academically oriented upper secondary education, leading to a vocational qualification or matriculation (Finnish National Agency for Education, n.d.). Finnish teacher education is research-based, the objective of which is to develop reflective teachers who take an analytical and critical approach to their work (Toom et al., 2010). All teachers graduate with a master's degree. During the pandemic, children with special educational needs, as well as first- to third-grade pupils of families working in critical professions (such as medical fields), were provided with normal schooling, and after some time, all first to third graders had the choice to attend normal school.

Compulsory education in England consists of one year of pre-primary education, referred to as "reception," followed by six years of primary schooling and four years of secondary schooling. Post-compulsory education consists of a two-year course at a sixth-form college preceding university study or vocational education undertaken at a further education college. However, since 2010 many policy changes have been implemented to reform education, particularly teacher education, as La Velle and Reynolds (2020) have noted. Whiting et al. (2016) described how as a result of this policy churn, there is an almost bewildering number of mostly school-based routes to qualifying as a teacher in the English system. However, Whiting et al. (2019) stated that most student teachers opt for teacher education courses provided by higher education institutes. These are predominantly one-year postgraduate courses to achieve qualified teacher status (QTS). Additionally, some undergraduate programs lead to QTS. During the initial phase of the pandemic, only the children of key workers, including parents working in health services, attended school in person. All other students were expected to attend educational provision virtually. Students' ability to attend school virtually was dependent on the availability of digital devices in their homes, necessitating programs providing laptops to homes in some geographical areas. As the pandemic progressed, the definition of key workers was expanded, but during subsequent lockdowns, teachers

continued to simultaneously provide both in-person and virtual learning options for their students.

Compulsory education in Norway consists of 10 years of primary and lower secondary schooling (grades 1–10). Pre-school (ages 1–5) and upper secondary education (grades 11–13) are optional, but the majority of children undertake both of these (NOKUT, n.d.). The Norwegian Directorate for Education and Training is responsible for supervising the quality of primary and secondary education (NOKUT, n.d.). Norway has a five-year integrated master's degree for all pre-service teachers at the primary and lower secondary school levels (grades 1–10), which was introduced to complement the centralized system that trains teachers for upper secondary education. The new teacher training program was introduced nationally in 2017, with pilots carried out during 2010–2017 in Tromsø and Oslo. Like Finland, Norway aimed to produce research-competent teachers who could work critically and analytically, as well as develop more specialized teachers with further training in specific academic subjects. During the pandemic, there was a temporary change in the education law to accommodate the various restrictions in place. For example, there was the option to allow children who received special education back into schools, regardless of the national policy on homeschooling. However, a large number of children still failed to receive the special education they should have had at the time (Utdanningsnytt, 2022).

Methods

Using a multiple-case study method, this research investigated teachers' experiences during the COVID-19 pandemic in Finland, England, and Norway. In each country, the data was collected during 2020 before writing this case-study article. Thus, each case was independent and focused on different aspects of remote teaching and therefore, methodology differed between cases according to projects' and researches' aims. The Finnish data was collected through an online survey, the English data through semi-structured individual interviews with follow-up group interviews and Norwegian data through semi-structured individual interviews. A case study methodology is an approach that focuses on a contemporary phenomenon in a real-world context (Yin, 2018). In comparison, a multiple-case study design selects cases with common characteristics, seeking to understand the differences and similarities between them (Stake, 2005, 2013). Researchers analyze the data both within a situation and across situations to identify such trends (Stake, 2013; Yin, 2018). The advantages of the multiple-case study designs/approaches are that its use offers evidence from several cases that try to find commonalities and differences, and therefore can spark more broadly about the phenomenon under study; however, multiple-case studies can be expensive and time-consuming (Baxter & Jack, 2008; Eisenhardt & Graebner, 2007).

Each case study answered the following sub-research questions: how was remote teaching perceived by teachers during spring 2020? and what kinds of challenges did teachers face? Through the findings, we answer the overarching research question: how could pre- and in-service teacher education be developed based on the experiences of teachers during the pandemic?

In Finland, the European Social Fund funded project 1 (May–December 2020) provided quantitative and qualitative survey data on 167 teachers' remote teaching experiences

and remote teaching competence during the early phase of the COVID-19 pandemic in northern Finland. In England, the data were drawn from the UK Research and Innovation (UKRI) European and Social Research Council (ESRC)-funded project 2—a collaboration between teachers and researchers in Finland, Canada, and England. The data was collected through 20 qualitative interviews with teachers focusing on children's voices and storytelling. In Norway, qualitative interview data from 31 newly qualified teachers were collected through the ongoing longitudinal project 3, a study that follows the first three cohorts of teachers trained under Norway's newly introduced five-year integrated master's teacher training program.

The sampling methodologies and analysis procedures varied according to each study's purpose in their national contexts. Even if all of them answer the common research questions, we see this as a limitation for our study when the data were not gathered using the same methodological principles. Therefore, for the purpose of the recent paper, the multiple-case study method was used to interrogate the findings from each of the national contexts. The implementation of this kind of methodological and researcher triangulation (Bekhet & Zauszniewski, 2012; Johnson & Christensen, 2020; Flick, 2014, 11–12) can be seen as a factor increasing the reliability of this study, in which the researchers independently familiarized themselves with the survey or interview research material and compared the obtained results. Methodological triangulation is helpful for interpreting results, collating more thorough data, increasing validity, and improving the comprehension of examined phenomena. Yet, there are few published instances it has been employed in the education field (Bekhet & Zauszniewski, 2012). Although the data was collected and analyzed using different methods, in line with Stake (2013), a rigorous comparison of the key findings from different policy and cultural contexts was beneficial for providing insights into the professional learning needs of teachers in a post-pandemic world. However, the comparative value of the different cases was limited since individual case studies were independent and the material was not gathered following identical approaches in the three countries.

All the participants were recruited by emailing information about the research and the voluntary participation invitation. In Northern Lapland, an email was sent to all the principals of schools. The principals then forwarded the message to the teachers of that municipality. The message included a link to a Webropol survey, the objective of the research and the data protection procedure. The teachers gave their consent for research by ticking a relevant box when responding to the survey. In England, all the early years classroom teachers of the chosen two primary schools were invited to participate in an interview. Written information and data protection procedure about the research and a consent form were sent to teachers by the researcher. In Norway, written information about the study and data protection, and a consent form were sent to teachers by the researcher.

The cross-case analysis had two phases. In the first, researchers in the three countries analyzed the results of the case in their respective country according to the teachers' perceptions and challenges. These were the themes that were identified as common across the three different cases through inductive thematic analysis. Then, in the second phase, the findings from the three studies were compared in terms of similarities and differences in the two common themes (teachers' perceptions and challenges). Through

the second phase, the research question "how could pre- and in-service teacher education be developed based on the experiences of teachers during the pandemic?" was answered.

The next section describes the context of each case study, followed by the methodologies, and the phase one findings together with interpretation of themes in each case (Stake, 2013). We then offer the discussion of the cross-case analysis of phase two findings.

Case study 1: Finland
Methodology
The purpose of this study was to investigate teachers' experiences and how they perceived remote teaching during spring 2020. Furthermore, we aimed to understand how their competence allowed teachers to meet the challenges presented by the sudden change. We conducted an online survey in Finnish Lapland of 167 educators from primary, junior high, and high schools regarding their experiences of conducting remote teaching in 2020. The survey containing both open-ended and Likert-scale questions, was sent to all primary school teachers in Lapland via the principals of the schools. The open-ended questions focused on the transition and execution phases of remote teaching, student assessment, positive aspects of remote teaching, and problems encountered. The Likert-scale questions were answered using a five-point scale (0 = not at all, 5 = very much). They were more detailed questions about the transition, planning, and execution phases, technical tools and solutions for remote teaching, success of teaching, stress encountered, and technological pedagogical competence. The sample of respondents represented different age groups and both new and experienced teachers. The findings on teachers' technological pedagogical competence were reported in detail elsewhere (see Korte et al., 2022) and are not included in this paper.

The open-ended responses were analyzed using data-driven thematic analysis (Graneheim & Lundman, 2004; Mayring, 2014). For each open-ended question, the analysis involved coding sentences on different themes and combining those themes when necessary. The quantitative responses were analyzed with SPSS analysis software using logistic regression analysis (Rita et al., 2008). Cross-tabulation, correlation coefficients, and correlation matrices were applied to explore the associations between the various variables in the data, and one-way ANOVA was used to analyze the statistical significance of the mean differences between groups. Regression and factor analyses were employed as multivariate techniques in the analysis.

Key Findings
Teachers' perceptions of remote teaching during spring 2020
The results regarding teachers' remote learning experiences revealed that the workload increased considerably (mean 4.0); however, the teachers felt that remote learning was successful (mean 4.0). According to the teachers, remote learning has some positive effects: certain students benefited from remote learning, and their learning outcomes clearly improved (due to, among other things, the possibility of progressing at their own pace, better concentration, and the removal of social pressure). Moreover, the teachers mentioned positive aspects, such as receiving help and teaching ideas from colleagues, the development of students' and teachers' ICT skills, the facilitation of personalized teaching, and the development of students' self-regulation.

Analysis of correlations between individual remote learning tools and teachers' experiences of success in remote learning showed that smartphones and tablets provided by employers improved the experience of success in remote learning. About 12% of those who used an employer-provided smartphone for remote learning felt that they were successful or highly successful in implementing remote learning, which was higher when compared with those who did not use an employer-provided smartphone. Furthermore, about 20% felt they did well or very well at implementing remote learning, which was again higher when compared with those who did not use an employer-provided tablet. Logistic regression analysis was used to examine the association between individual remote teaching tools and teachers' experiences of success or their workload. The initial analysis revealed that using digital tools provided by one's employer was statistically significantly ($p = 0.017$) associated with an increase in teachers' experience of work success. Next, all non-significant variables were removed and a new analysis performed. The only device that had a constant effect on the experience of success during remote teaching was a tablet provided by the employer (odds ratio: 5.0). Using a personal or employer-provided desktop was associated with diminished success in remote learning. In fact, when participants used their own desktop computers, this slightly increased the workload experienced (odds ratio: 0.9, $p = 0.024$).

Challenges faced by teachers during spring 2020

Teachers mentioned several problems with implementing remote learning. For a start, they experienced technical problems due to poor internet connections, students' lack of technological skills, and students' varying access to remote learning tools. They also reported difficulties in reaching and communicating with students, with some absences and dropouts from the online lessons. Teachers also experienced challenges with supporting students' learning, motivation, and self-direction, as well as with individualizing learning.

Teachers wished for more training related to online pedagogy in the planning, implementation, and evaluation of remote learning (e.g., pupils' work, individualization, and activities), as well as training on the use of remote learning software and applications.

Case study 2: England
Methodology
The second case was designed to examine the roles of voice, agency, and narrative as theoretical concepts in early years education settings. Two primary schools in Yorkshire, Northern England known for their provision of high-quality education were chosen as data collection sites. A qualitative, ethnographic, co-participatory approach was adopted for data collection and analysis throughout the project, facilitating an understanding of the diverse experiences of individual teachers (Clarke et al., 1996). It has been noted that differences in professional cultures between classroom teachers and academic researchers can cause miscommunication; therefore, it was proposed that adopting this ethnographic, co-participatory methodology would ensure a highly productive relationship between participants and the research team (Ebbutt et al., 2000).

The first phase of the project was a baseline audit consisting of semi-structured interviews with 20 early years practitioners (Evans, 2018). All staff in the early years classrooms in the two focus schools were individually interviewed, with the interviews lasting between 30 and 45 minutes. Conducted in July 2020, the focus of the interviews was on teachers' experiences of teaching and learning when they were physically separated from most of their pupils for several months. All interviews were conducted and recorded, subsequently transcribed and thematically analyzed (Miles et al., 2018). Emergent themes included professional uncertainty, ethics of professional care, embracing new opportunities, digital poverty, the challenges of hybrid teaching, and the need for professional learning.

Key Findings
Teachers' perceptions of remote teaching during spring 2020
When the teachers articulated their experiences of the rapid shift to online learning, this proved to be an emotive subject. The staff interviewed represented a wide range of career stages and experiences as early years practitioners. Yet, as professionals working in schools known for providing high-quality education, they were used to exhibiting high levels of professional competence and confidence in their work. The teachers spoke movingly about how unsettling it was to suddenly embrace new ways of providing learning opportunities for their students.

These feelings of uncertainty were exacerbated by wider concerns about the health and well-being of young people during the global pandemic. Both schools maintained excellent pastoral care for their students; to do so, in the first few weeks of the pandemic, during the initial school shutdown, school staff in England focused more on the welfare of their students than on the provision of online learning, in line with many of the studies in Owens' and Ennis's meta-analysis (2005). Contact between staff and students took the form of "checking in" with each other rather than making informed moves to advance the learning of students. During this time, the possibilities in the digital sphere were explored (König et al., 2020).

The teachers also mentioned that the new teaching situation provided benefits. All staff valued the opportunity to hold one-to-one sessions online with students, considering this quality time with individual students in their home environment beneficial. For these students, speaking with their teachers about their safety seemed to provide a comfortable environment that allowed them to participate more fully than they did in the classroom. This aligns with the findings of Beaton et al. (2021a), who found that for many students with disabilities, particularly those with autism, the online learning environment during the pandemic was viewed as a safe and effective space for learning.

As they became more confident in their use of technology to provide learning opportunities for students, the teachers recognized the opportunities this situation offered for exploring new pedagogies (Chauhan, 2017). One teacher spoke enthusiastically about encouraging individual students and their families to lead some of the learning from their home, such as one student and her mother who demonstrated making crepes in French. Several of the teachers spoke about online learning having initially been challenging, but once they began to experiment with the affordances of the medium, they enjoyed the freedom it provided to try new ways of working.

Teachers' perceptions of remote teaching during spring 2020

One major challenge highlighted by the teachers was the lack of digital devices for some of their pupils. In areas of high economic deprivation, some pupils had access to only a mobile phone rather than a laptop or tablet, which was often shared with siblings. This is an ongoing issue in areas of high deprivation (Rallet & Rochelandet, 2007). For some pupils, access to a mobile phone was also challenging due to the high cost of data usage.

In addition, teachers expressed concern about the competence of some parents to facilitate home learning, particularly those who did not speak English as a first language. Yet, over time, many of these issues were addressed with the support of older siblings or other family members.

A concern that remained throughout the pandemic was the challenge of hybrid teaching since the children of "key workers" attended face-to-face in their classrooms while most students were taught remotely in their homes.

The data analysis indicated that the pandemic required teachers to be adept at using new technology and familiar with the affordances of digital provision within education (Chauhan, 2017). The teachers articulated that the sudden move to online learning shook their professional confidence in their ability to provide meaningful and effective learning for their students. Although they rose to the challenge and rapidly developed their ability to work with the available hardware and software, two of the teachers noted that developments in technology moved rapidly, and it was challenging for teachers to keep abreast of new developments.

The analysis also highlighted the need for teachers to be aware of the values that underpin their practice. A key theme arising from the data analysis was the underpinning ethic of professional care for others, which informed the decisions the teachers made (König et al., 2020). Although the provision of online learning was not necessarily of a high standard immediately after the lockdown commenced, each of the teachers noted that their professional priority was to make the best choices for their students, despite the adverse social context.

The novel situation created by the pandemic demonstrated a need for teachers to determine their own professional learning needs and for teachers to be trusted to make independent pedagogical choices as circumstances changed, similar to the proposals made by Beaton et al. (2021b).

Case study 3: Norway

Methodology

To compare the new teacher training program's aims and objectives with its practical outcomes, recent newly qualified teachers (NQTs) from UiT The Arctic University of Norway (UiT) were surveyed and interviewed at various time points to create a longitudinal study. Data were analyzed using thematic analysis (Braun & Clarke, 2006). Individual interviews were held over three years (2015–2017) with around 30 graduating students of both genders a few days after they submitted their master's theses, and then they were interviewed again after one, two, three, and five years in service. Due to the

global pandemic, only the interviews after four and five years of service were included in the analysis presented here. These included 31 teachers after retention losses were accounted for: 14 teachers from the first cohort, 6 from the second, and 11 from the third. An open-ended, semi-structured interview guide (Kvale, 2008) was adapted for each year of data collection to capture changes in the students' experiences regarding their work as NQTs. Each interview lasted 45–60 minutes and was recorded and transcribed.

The analysis was intended to capture the perceived realities of the NQTs as the pandemic unfolded. First, the data were interpreted inductively by grouping all similar thematic statements using broad bucket coding in NVivo 12 (Bazeley, 2007). To determine overarching themes, the process included coding whole sentences and sequences based on their content. Process memos were used to write down the researchers' reflections and generate ideas for categorizing the data (Maxwell, 2012). After the initial bucket coding, similar codes were merged and some were deleted.

The included codes were drawn from frequently used statements concerning the actions and processes informants found important. Whiteboards were used as a creative visual tool to identify and qualify the explanatory relationships between the categories (Maxwell, 2012). Informants' experiences were summarized in a table to visualize similarities and differences, and the codes were connected to the theoretical framework to gain a deep understanding of the NQTs' experiences.

Key Findings

Teachers' perceptions of remote teaching during spring 2020
Norwegian teachers generally approached the challenge of suddenly moving to remote online teaching with trepidation. Some raised concerns about the increased workload and uncertainty around technology use. There was also great concern about pupils' welfare. Teachers specifically raised concerns about the difficulties that some children faced in reaching all the main curriculum outcomes/goals/learning outcomes. Some teachers were resigned to the likelihood that not all children would achieve the goals and believed that their general welfare was more important.

On the upside, one teacher noted that because the pandemic required them to think differently while teaching online, their teaching became more varied. Some also reported being inspired to use more digital resources when they eventually returned to the classroom. One teacher reported a positive outcome of the pandemic lockdowns: they had developed better and closer relationships with their pupils due to working more intensively with them in digital environments. In addition to the new form of lesson delivery, the onset of the pandemic also required that teachers worked together in new ways. Some of the Norwegian teachers reported improvements in collaboration and support from colleagues, fostered by working online.

Challenges faced by teachers during spring 2020
Several teachers felt proud to be considered "essential workers," and the pandemic raised the general public's awareness of and respect for teachers. Nevertheless, increased workloads, lack of technological equipment, and concerns about students' educational outcomes were all cited as challenges.

Furthermore, changes to regular teaching activities meant that previously planned classes and field trips had to be completely reorganized or canceled. Specific concerns about information technology equipment were raised regarding pupils' and teachers' access to high-quality, functional, and up-to-date equipment. Previously, they had managed with older equipment that could be shared and spread over several classes, but it quickly became apparent that more and newer equipment was needed.

Challenges were encountered, too, with delivering adapted and special education effectively. Specific issues related to how pupils who normally had classroom assistance would maintain their education. Teachers complained that it was burdensome for the main class teacher to take on extra individual-focused teaching since classroom assistants were effectively absent from online/distance education settings. One teacher, however, suggested that it was actually beneficial for general working collaboration since the pandemic meant there were fewer assistants involved in some pupils' education.

Several teachers said they considered leaving the profession during the lockdown period; however, to our knowledge, none of those who mentioned this followed through and left (though the reasons for some participants' dropout from the project were difficult to verify).

While teachers generally believed they delivered good-quality education during the lockdowns, they also raised concerns about a lack of resources and feeling underprepared. Norwegian teachers expressed a need for greater digital competence and called for fresh education on technology and how to use it, along with improved information on technology-based equipment.

Discussion
Differences and similarities of the findings from the case studies
Our comparison of the three case studies' findings indicates there were both similarities and differences in teachers' experiences in the three countries. Remote teaching was an unexpected development for teachers that placed new demands on their competencies, and in different ways, it was viewed both positively and negatively by teachers. This comparative multiple-case study has examined teachers' experiences, especially their perceptions and challenges, in three countries during the COVID-19 pandemic to determine which areas should be developed in pre- and in-service teacher education based on teachers' experiences. Teachers' perceptions and challenges were divided in five sub-themes that emerged from the comparison of the data in the three countries: 1) teacher-student relations, 2) teachers' competence, 3) teachers and surrounding society, 4) students' competence, and 5) technology.

In teacher-student relations we looked at teachers' experiences regarding their relationship with the students individually and as a group, how they communicated and what kind of concerns teachers had for their students. Particularly challenging for teachers was supporting students' individualized learning, as mentioned by Finnish and Norwegian teachers. However, in Norway the teachers felt closer relationships with students than they had in the classroom as they could give them more intensive attention during online meetings.

In the three countries teachers were concerned about the well-being of students. In Finland, teachers worried more about students who were absent from online lessons. Reaching students during the pandemic proved more difficult in some cases than in face-to-face teaching (Ahtiainen et al., 2020). For such reasons, the Norwegian and English teachers voiced concerns about whether certain students would achieve the main learning outcomes. So, remote teaching seemed to considerably affect teacher–student relationships.

In teachers' competence we analyzed aspects regarding teachers' professional know-how. In the three settings, the teachers reported feeling underprepared, which the English and Norwegian teachers described as having shaken their professional confidence. Similarly, previous studies reported teachers' challenges with pedagogy during the pandemic (e.g., Beardsley et al., 2021; Jaenudin et al., 2021; Perifanou et al., 2021). All teachers wished for additional training on using educational technology and online pedagogy. Teachers reported some common positive experiences related to their improved proficiency in using digital technologies and new and diverse pedagogies, which is in line with the study by Beardsley et al. (2021). Similarly, Ahtiainen and colleagues (2020) found that teachers' digital skills improved during remote teaching and learning.

Regarding teachers and the surrounding society, we concentrated on anything that mentioned teachers outside of their own classroom and student context. Teachers from the three countries reported that communication and collaboration between other teachers improved during the remote teaching. Norwegian teachers reported having experienced the increase in teachers' professional appreciation because of the Covid-19, while English teachers raised concerns about students' parents' ability to facilitate home learning.

Students' competence encompasses the teachers' views on any given skills of the students. The teachers in Finland and England found that remote teaching increased students' ICT skills. The Finnish teachers also mentioned that students' self-regulation skills increased. However, the Finnish teachers also raised concerns about students' lack of digital skills.

The aspect of technology refers to the teachers' experiences regarding the use of technology. Teachers in all three countries experienced technical problems while teaching remotely, especially relating to a poor internet connection, lack of devices, and lack of high-quality functional equipment for teachers and students. In this way, our findings corroborate the results of previous studies (Ahtiainen et al., 2020; Beardsley et al., 2021). According to previous studies (e.g., König et al., 2020), school-provided technology positively affects teachers' success in mastering the challenges of online teaching. The Finnish case study confirmed and widened this notion by suggesting that technological devices provided by employers could decrease teachers' workloads during the COVID-19 crisis. Finnish and Norwegian teachers found that their workloads increased with remote teaching and learning. Yet, the findings of the Finnish case study indicate that the use of an employer-provided desktop is statistically significantly associated with a reduction in workload, whereas the use of a teacher's personal desktop

is statistically significantly associated with a perceived increase in workload. Moreover, the results suggest that tablet computers provided by employers correlate statistically significantly with teachers' success in organizing remote learning. However, these findings concern only the Finnish case study so generalizations should be made with caution. Alongside technology provision, many other factors are related to teachers' workload and success in remote teaching, such as support from colleagues and students' access to devices, which are aspects that were not examined in this study. Besides challenges, the Finnish and English teachers stated that the online environment was a safe and effective space for their students to learn.

Findings of the teachers' perceptions and challenges on the remote teaching situation are widely applicable since teachers in different parts of the world had similar experiences, facing many of the same benefits and obstacles concerning remote teaching (UNESCO, 2020). However, as policy reports emphasize, there were many contextual differences between countries and areas concerning their preparedness for a crisis and their ways of organizing the period of remote and hybrid teaching, reflecting different socioeconomic and cultural circumstances (UNESCO and Global Education Monitoring Report, 2021). There can be substantial differences within a country and even between schools (UNESCO, 2020). This was seen in the English case study, which revealed that pupils particularly lacked sufficient technological devices in areas of economic deprivation, with the digital divide exacerbated during school closures (UNESCO International Bureau of Education, 2020; UN, 2020).

We presume that similarities noted between the three case studies derived from the relatively similar educational systems in the three northern European countries and their high levels of digitization. Differences between the three case studies' findings, meanwhile, can be seen to have arisen from their contextual variations, along with aspects we did not study or consider in this study. Teachers in the three countries worked at several schools with different technological and pedagogical preparedness, which was also not measured in this comparative study. In addition, although the three respective countries have high digitization, the schools also applied different rates and levels of digitization during the lockdowns (UNESCO, 2022). Overall, teachers' technological pedagogical competence varied, which affected their experiences of remote teaching between and within the three countries.

Implications for Pre- and In-Service Teacher Education
International policy reports highlight the need to increase teachers' readiness for crisis situations and strengthen their competence in remote and hybrid teaching (UNESCO, 2021; UN, 2020). This study sheds light on how school closures and a period of remote teaching affected teachers' instruction. From the results, it is possible to identify certain implications for pre- and in-service teacher education, which may be developed to better prepare teachers to lead their students' learning today and in the future.

First, curriculum attention should be drawn to technological, pedagogical, and psychological aspects of schooling, to ensure teachers' better preparedness for changing learning environments and possible crisis situations. Regarding technological and pedagogical aspects, future teachers would benefit from learning the pedagogical uses of multiple digital learning environments and video meeting tools, which in normal times,

can be beneficially utilized in their face-to-face contact teaching and daily teacher work. Remote and hybrid teaching could also be applied and practiced during different phases of initial teacher education. Since faculty collaboration and support are essential to successful remote teaching, it will also be useful for student teachers to apply collaborative learning approaches in teaching practice. Moreover, regarding psychological aspects of the profession, students', families' and teachers' well-being should be addressed, with training on how to support such well-being, as well as recognize the effects of unexpected and exceptional times (e.g., school closures) on well-being. Teachers already in the field would benefit from tailored professional development possibilities on the above-mentioned topics. Those teachers who experienced school lockdowns during 2020 could act as experts whose knowledge can be used to help develop both student teachers' education and qualified teachers' professional learning.

Conclusion
This article presents a multiple-case study conducted in Finland, England, and Norway, presenting situations in northern educational contexts in the respective countries. Findings from these case studies are generally not valid for wide contexts and organizations. To overcome that, a strength of this study is its comparative approach as the findings are drawn from slightly different settings that complement one another. Furthermore, although the results reported here originated from a relatively small number of informants, our detailed description of the specific cases enables the findings to transcend their original contexts and contributes to how we can understand similar social contexts (Hellström, 2008). Both qualitative and quantitative analyses produced knowledge of teachers' perceptions and challenges they encountered. Through the quantitative analysis of the Finnish case, it was possible to gain a more nuanced picture, for instance, of the support that teachers received with remote teaching, the technological tools they applied, and their workload. At the same time, the findings from England voice the teachers' concern about the parents' abilities to facilitate learning at home, while the Norwegian teachers mention their concerns about not being able to achieve the curriculum learning goals.

In future studies, it would be beneficial to compare findings from a wider range of countries and contexts concerning teachers', students', and guardians' experiences. It would also be interesting to examine what kinds of influences cultural, locational, and educational contexts have on the findings. Furthermore, empirical studies could identify and investigate which of future teachers' competencies and practices are linked with the technological, pedagogical, and psychological aspects of schooling in the future.

The COVID-19 pandemic impacted education provision globally and sped up a process of increasing digitization, which was underway before the pandemic. However, the speed of the transition was an issue because it did not allow teachers to prepare for new ways of working. In this study, we investigated what could be learned from remote teaching experiences during the pandemic and how we can evaluate and develop teachers' education in a post-pandemic world. The findings suggest that teachers wish for additional education on online pedagogies and the practical and pedagogical use of technologies. Furthermore, we highly recommend future teachers engage in activities that support group dynamics and team building with colleagues, to enhance and

improve collaboration and the work atmosphere so that greater ideas and thoughts are shared.

Ph. D. Satu-Maarit Korte *(University of Lapland, Finland), is a senior lecturer in media education. Her key research interests are technology-mediated learning, media and psychosocial well-being, and neural foundations of learning.*

Ph. D. Minna Körkkö *(University of Oulu, Finland) is postdoctoral researcher. Her research interests include teacher professional development and teacher competence as well as student teachers' reflection. Especially, she is interested in using a video and other technologies as tools in teachers' and students' learning and competence development.*

Ph. D. Outi Kyrö-Ämmälä *(University of Lapland, Finland), is a university lecturer in teacher education. She is also a Vice Dean responsible for teaching at the Faculty of Education. Her key research interests are inclusive education, inclusive teacher education and pupils' cognitive skills.*

Ph.D. Miia Hast Miia *(University of Lapland, Finland), is a university lecturer in craft education. His main research areas are craft technology, learning analytics in skill and art subjects, digital pedagogy, and artificial intelligence in teaching and learning.*

Lic. Sanna Mommo *is a university teacher of craft education at the Teacher Training Institute of the University of Lapland, Finland. Her teaching focuses on the didactics of both textile work and multi-material handicraft. Her researcher research focuses on the pedagogical implementation models of multi-material crafts, the cultural significance of crafts and materiality.*

Ph.D. Merja Paksuniemi (*University of Lapland, Finland), is a university researcher at the Faculty of Education. Her key research interests are teacher education, wellbeing and education, and ideologies and social contexts of education.*

Ph. D. Gregor Maxwell *(UiT The Arctic University of Norway) is an associate professor in inclusive and special education. His research interests are inclusion and participation for marginalized children and teachers' inclusive and special education competences.*

Professor Mhairi C Beaton *is a professor at Carnegie School of Education, Leeds Beckett University in the UK. Mhairi's research interest lies at the interface of teacher education, inclusion and student voice.*

Professor Pigga Keskitalo *(University of Lapland, Finland) is a professor in education, specifically in Arctic perspectives in education. Her research interests are Indigenous education and Indigenous research methods in various diverse educational contexts, more specifically Sami education and research.*

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