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Practical Family Challenges of Remote Schooling during COVID-19 Pandemic in Finland

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Figure 1: Typical remote schooling technology usage contexts reported in the online survey: In bed (reported by 31%), child's own desk (68%), on the floor(21%) and on the sofa (11%). Not illustrated - shared table (57%). Photographs posed by an actor

ABSTRACT

The COVID-19 pandemic in spring 2020 caused the rapid introduction of remote schooling in many countries. This transition caused a variety of challenges to families, encompassing organizing home workspaces, setting up computing equipment, and, for many parents, managing their own remote working in parallel with the schooling arrangements. This paper describes the findings from an online survey (n = 114) and an in-depth interview study (n = 14) conducted in Finland during the COVID-19 remote schooling phase. Focusing on issues surrounding technology usage in the family setting, we report on the array of applications parents and children were required to manage, strategies to share ICT equipment within families, spatial organizational issues and the high levels of flexibility needed from parents and other stakeholders to enable the remote schooling.

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CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in collaborative and social computing*.

KEYWORDS

distant education, remote schooling, COVID-19, home, family, children, parents

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1 INTRODUCTION

The global spread of the COVID-19 pandemic in spring 2020 changed the way we live, and, in many sectors, everyday life was rapidly diverted onto a different track. The need to avoid physical contact between people, to reduce the spread of the virus, led many countries to introduce rules and recommendations to stay at home. Consequently, this resulted in the closure of school buildings and moving to the mode of remote schooling of children at home. In Finland, this massive transition to distant education happened rapidly and with little notice, and for the vast majority of families, as well as for teachers, was the the first experience of distant education. Questions related to remote school education and the integration of

technology into teaching, which have previously been of major discussion points (e.g., [5]), were instantly bypassed by the nationwide activation of the remote schooling mode.

The transition of school days from face-to-face education practices to computer-mediated teaching over distance required the rapid adoption of different information and communications technology (ICT) tools by a wide user group. After this change, there began intense public discussion about families' resources to cope with the exceptional and uncertain situation. Parents reported being on an emotional roller coaster, where feelings of dealing with remote schooling varied from novelty to exhaustion. Families struggled to create new everyday routines in the suddenly changed circumstances – to balance between the adults' work, children's remote schooling and other daily tasks and duties [35].

In this paper, we address the phenomenon of remote schooling during the COVID-19 pandemic in spring 2020, and focus on the practical challenges caused in the families of primary school children (ages 7 - 12). The research was conduced in Finland, which has a very homogeneous school system and follows a well defined national curriculum for teaching. The ceasing of contact education and the activation of remote schooling in Finland happened simultaneously country-wide on Wednesday 18 March 2020 [12]. At the same time, the the Finnish Government also gave the recommendation that all work should be conducted remotely, from home, whenever possible [11]. Therefore, families were required to adapt to simultaneously changed circumstances in central areas of everyday life. We investigate parents' viewpoints on different aspects related to the remote schooling arrangements. Especially, we chart the experiences and challenges related to technology use, and how the remote schooling affected family dynamics. Although there has been extensive prior research addressing distance learning [2, 43] and computer mediated learning [20, 40], the circumstances during the COVID-19 pandemic suddenly brought the issue society-wide. This presented a unique research setting to investigate the phenomenon of remote school education adoption in practice in families. Rather than focusing on the educational efficacy of the new mode of teaching, we focus on issues surrounding the impact of the required technology usage in the family setting. We report on the array of different applications parents and children were required to manage, strategies that were adopted to share ICT equipment within families and the high levels of flexibility needed from all stakeholders to enable the remote schooling.

2 RELATED WORK

Clearly the situation caused by the COVID-19 pandemic, and specifically the sudden adoption of remote schooling and working, was without precedent. However, insights on the challenges faced, and potential approaches to address them, can be drawn from prior research on ICT use in remote schooling and on technology use in family contexts, during more normal times.

2.1 HCI and Remote Schooling

Finding the correct focus for relevant related work on HCI and distance schooling requires careful consideration. For example, the large body of work reporting on e-learning [28] may be of limited applicability in the current context, if teachers primarily utilize ICT only as a communication channel. Whilst it has been reported that teachers need to adopt new approaches for distant teaching [18], given the time constraints on beginning distant education during the pandemic lockdown period, it is expected that teachers primarily shifted their existing contact teaching lessons and materials online, rather than specifically developing asynchronous learning materials.

Similarly, works exploring homeschooling, i.e. parent-led home-based education [36], where a parent fully adopts the role of teacher, may feel of little use to a parent suddenly thrown into the role of supporting their child's remote education while themselves struggling to work from home. Prior work has noted parental concerns about the distribution of responsibilities required by e-learning, highlighting the need for renegotiation of the school–parent partnership and highlighting the benefits of peer support among parents [24]. The implementation of such processes would require school organizations to make considerable investment, both financially and in terms of teachers' time [1].

A primary tool in remote schooling is the laptop computer. Prior work has informed that children's' laptop usage in the home environment is likely not situated at an ergonomically designed workstation [15]. Based on a survey, Harris et al. reported that postures such as laying prone on the floor, sitting on the floor, sitting with laptop on the lap, and other non-table configurations, accounted for nearly 70% of school children's laptop computer usage. Usage in such postures, particularly laying prone on the floor, has been identified as potentially causing discomfort and future musculoskeletal complaints [10].

2.2 Technology Use in Families and Family Coordination

Under normal circumstances, technology use (particularly smartphones) in families has been reported as a point of conflict and cause of stress, both from the point of view of children's addiction [21], and parents handling work-related tasks during family time [6]. It is likely that the acute pandemic circumstances will highlight many of the pain points identified in prior work. While the majority of research addressing the culture of technology has focused on adults as a user group, also technology use in families has gained attention. Technology has emerged to be omnipresent and is today commonly used in different places at home, including e.g. kitchens, bathrooms [22], and in bed [37]. Research has looked at how technology use at home influences on the interpersonal relationships in families [17, 26, 37, 41]. Research on adolescents' technology use has particularly focused on problematic use [14, 33] and the negative effects of technology, e.g., how parents' technology use impacts on children's behavior [23]. A number of research works have addressed the family rules and expectations related to technology use, such as parental apps to control children's smartphone use or screen time [9]. Setting family rules on technology use are encouraged [19, 29], but often become undermined by the practices of everyday life [29]. Hiniker et al. reported that both parents and children feel that certain family times should be devoted to being time without smartphones, even if they struggle to obey this ideal [19]. Safety related practices have also gained attention in research

focusing on families and technology use. Technology use for children's safety monitoring purposes has not only addressed the risks related to children's online behavior [42], but also, e.g., allowing parents' to monitor their children's independent outdoors mobility [7].

HCI research has also addressed the family coordination activities, how technology entwines with it, and how different coordination tools support the family in both functional and socio-emotional ways [27]. Much of the research has taken a functional angle, addressing tools such as family calendars or messaging [30, 34, 38]. It has also been reported that technology supported awareness of each other's location and activities strengthens the emotional connection between family members [3]. Considering organizational practices, Davidoff et al. investigated dual income family practices on transporting children to and from their different activities, and report on how established routines ease the smooth execution of the activity [4].

2.3 Positioning of Our Research

In our research, we focus on the family experiences with remote schooling during the spring 2020 COVID-19 pandemic in Finland, taking a HCI research approach to the topic. The scope of the research excludes the pedagogical and educational content in the remote schooling experience.

3 RESEARCH SETTING AND METHOD

In the following, we shortly describe the research environment surrounding the introduction of remote schooling in Finland in spring 2020, and outline our research method.

3.1 Remote Schooling in Finland during COVID-19 Pandemic

On March 16 2020, the Finnish Government, in cooperation with the President of the Republic, declared a state of emergency over the COVID-19 outbreak. The activated measures included closing down the premises of all education providers, suspending contact teaching, and reorganizing teaching as distance learning. One day's notice was given before the arrangements entered into force on March 18 2020[12]. As an exception, for parents working in sectors critical to the functioning of society, contact teaching for school grades 1–3 was still provided, but not recommended [13]. According to a survey by the Finnish Ministry of Education and Culture, only 9% of schoolchildren in this age group continued to participate in contact teaching [32]. The study was conducted at the end of April 2020, at which point the homeschooling had been in operation for approximately 6 weeks. Contact teaching in primary and lower secondary education in Finland resumed on 14 May 2020 [31]. Thus, our research is positioned in a unique 2 month time window, where remote schooling was taken into use and used as the almost-exclusive teaching mode through the whole country. In Finland, all schools follow a national core curriculum, which sets the objectives and the core contents in different subjects [8]. Hence, Finland provided a rather uniform sample where likely similar challenges resonated across the whole country.

3.2 Research Method

Aiming to explore the impacts of the remote schooling on affected families, we adopted a mixed methods approach, including a large sample online survey and in-depth interviews with a limited sample size. Through this approach we aimed to collect both broad and rich data, which when combined would provide valid insights to the topic.

3.2.1 Online Survey. The online survey targeted parents with children in primary school grades 1-6, i.e., aged 7-12 years. The survey included six background questions about family circumstances and the adults' work situation during the remote school day. This was followed by questions related to the technology use and sharing in the family, how remote schooling conditions were practically organized at home, and the overall remote schooling experience. The survey was piloted before distributing it through email lists and school related social media forums in Finland. The survey included compulsory multiple choices questions, complemented with open text questions to get more detailed information. The survey took approximately 10 minutes to complete.

Altogether, 114 responses were received to the survey, 78% of respondents being female, 21% male and 1% other/preferred not to state. The majority of respondents were aged between 36-45 years (65%), with the remainder being 46-55 (18%) and 26-35 (18%). Most households had a single primary school age child (66%), others having two (25%) and three or more (9%). Approximately half of the households had older siblings (56%) or younger siblings (40%). As expected, at the time of the survey most respondents were working from home (70%). Of those that reported a second parent living in the home (89%), two-fifths (38%) were also working from home. Respondent engagement with the online survey was high, the eight optional free text questions receiving a total of 638 responses, with 236 of these being more than one sentence in length.

3.2.2 Interviews. To gain deeper insights, we conducted interviews with 14 parents from different areas of Finland. The interviews were held using online meeting platforms such as Skype and Microsoft Teams, consisted of background questions and eight interview questions, and lasted for approximately 15 minutes. The interview focused on the same aspects as the survey: technology use and sharing, organizing family practicalities, and the overall experience with remote schooling. The interview results were transcribed and thematically coded. The emerging themes and codes within themes were identified, after which, two researchers independently analyzed the interviews, grouping the responses according to the developed codes. A 3rd researcher then arbitrated any conflicts. Details of the interviewees are provided in Table 1.

4 FINDINGS

In this section, we report the combined findings from our online survey and in-depth interview based studies. We refer to individuals as survey *respondents* and interview study *participants*, e.g., P3 as the third participant in the interview study and R21 as respondent 21 of the survey.

Table 1: Participants in the in depth interview. Children attending primary school are underlined. Work situation key: RW = At home - Remote work, TL = At home - Temporarily laid off, AH = At home normally, OH = Working outside home. a) = Plus 3 other pre-school children.

Participant reference	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Adults in household	2	2	2	2	2	2	2	2	1	2	2	2	2	2
Children's ages	4,8	8,10	8	9,11	7,9	10,13, 15	3,5,7, 11,11,13	5,8	7,10	5,8	7,10	13,14	8	9,10, a)
Parental work situation	RW AH	OH OH	OH OH	TL OH	RW OH	OH OH	RW/OT RW	OT RW	TL	AH OH	AH RW	OT RW	RW RW	OT AH

4.1 ICT Hardware and Software

4.1.1 ICT Tools in Use. From the online survey, children were reported as using a variety of ICT devices as part of their remote schooling (Figure 2). Almost all using a smartphone (94%), in conjunction with tablets (57%), laptop computers (84%) and desktop computers (25%). The most common collaborative tool used, reported by 96% of respondents, was video calls, in either smaller or whole class sized groups. Collaboration in an online shared text document was also a common approach reported by 64% of respondents. Text based chat tools were reported to be used for schoolwork based communication between classmates or the teacher by 36%. One fifth of respondents (19%) reported not knowing if chat apps were used as part of school work by their child or not.

Not surprisingly, the remote schooling required a heavy use of ICT tools. From the survey, a wide range of average daily ICT device usage time for school tasks was reported, with 20% spending one hour or less, 32% two hours, 22% three hours and 26% four or more hours. This was also reflected in the interview findings – the use of ICT tools was expected and accepted by parents, and was regarded as the natural way of remote schooling. Whereas it was common that the child needed to use different tools, e.g. video calls, Teams meetings, chat and shared documents, both survey and interview responses revealed large differences between individual teachers and classes on the particular usage. Whereas some interviewees responded that they had not been required to install anything (see Section 4.1.2), some reported a myriad of applications that had been needed. For example commenting, "We have Google Meet. Then of course Wilma [the national messaging application between home and school] which is automatically in use. Then Classroom. [..] Then YouTube, that's installed already. [...] Then there are three or four different games, which support learning. There's math games and English games, some work, some don't. And then you get instructions to use 10 minutes this or that game, as for instance today. Then there are book apps, which you should download. But we didn't download them all" (P3). Similar challenges caused by the large number of different applications needed were raised by survey respondents. This lead to specific problems with the amount of passwords children needed to handle, e.g., "The second grader (8 year old) had problems with the passwords of various programs, and needed help. The fifth grader handled this without help" (R5).

As some of the applications could be run on alternative devices, e.g. smartphone or laptop, participants reported needing to first

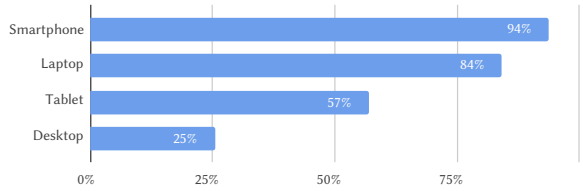

Figure 2: Percentage of online survey respondents (n=114): ICT equipment used for remote schooling. Multiple choices allowed.

experiment to find the optimal device for each application, "Initially, there was a challenge to find the right device for every application..."(R35). Overall, respondents reported that the children (and supervising parents) were required to manage a suite of devices and applications to complete their school work. In some cases this cross-device usage was particularly challenging, "There were too many different places where we were supposed to be at any given time. Links were given in a WhatsApp group, which they [the child] had to manually type in the address bar on the computer. This was a challenge, especially when the child was very often alone during the home school day, while the parents were at work "(R74).

Several interviewees also mentioned that the practices of how ICT tools were used had changed and developed during the remote schooling period, e.g., "The school tasks come to parents through the Wilma tool, and then in Meet the teacher goes them through with kids, and then they do them in Meet or Classroom. During the past weeks, the teachers took Classroom forms into use, and now give feedback through that, and [kids] do the self-reflection and sign out the tasks. In the beginning [...] it was so that parents needed to sign the tasks done through WhatsApp. [...] So altogether that's quite a multi-channeled thing." (P11).

4.1.2 Managing and Sharing the Tools. Remote schooling had also resulted in the need to acquire new equipment in some families. From the survey, 18% of respondents had bought new equipment or software to support the remote schooling, ranging from new laptops (5%), to headphones and webcams. One respondent reported upgrading their internet connection to support the increased number of concurrent users. Problems with the internet connection, i.e., insufficient bandwidth for many users, or simply cutting off,

were raised by numerous respondents, e.g., "Everything has gone surprisingly well – the internet connection is sometimes a bit of a problem"(R55). The interviews revealed only two cases where the family had needed to buy new equipment, being headphones (P1, P14) and a microphone (P14). Additionally, three families (P2, P7, P14) were loaned a laptop or tablet by the school, and a smartphone (P3) and laptops (P6) were borrowed from relatives. One participant commenting, "We had to get, to borrow, laptops from grandparents, so that everyone can have their own laptop in use. Because those compulsory Teams lessons could happen at the same time with everyone. The own laptops in the family wouldn't have been enough for everyone" (P6).

Access to computers, either laptop or desktop, is of particular interest as these are generally required for good user experience with the remote schooling tools in use, particularly when there is need to multitask across several applications at once (as previously noted). From the survey, during the school day, a majority of children (68%) had a laptop or desktop computer for their own use, (27%) shared one with another child or adult, and (4%) were without a computer. A typical comment in this respect being, "A laptop, desktop and tablet are shared and circulated among adults and children" (R16). Also, 9/14 of the interview participants reported sharing of computing equipment within the family during the remote schooling, either a laptop (6/14) and/or tablets (5/14). For example commenting, "[Before getting a laptop from the school] the child used my laptop, and I tried to juggle with my phone and laptop and so on. So we took turns, kind of." (P2), and, "Now we have a Chromebook, a Mac and a iPad. With those we take turns. Sometimes it happens that I also have a meeting, and we use [the devices] one person after another. The devices are of different age and condition, so we do it so that everyone gets to have the best one sometimes" (P11). For one survey respondent the circulation of ICT equipment was based on different applications working only on specific machines, "Zoom works from one computer, Google Meet on three, Kahoot [app] on the phone, ... and a couple of other apps on the desktop PC, ... It is disorganized because we have a Mac and a PC, Linux and Windows machines, and not all applications work on all machines, or the smartphone needs more memory than is available" (R43).

To support the remote schooling, 75% of the survey respondents and 9/14 of the interviewees reported needing to install one or more applications to their child's smartphone, tablet or laptop. The most commonly installed apps according to the survey were Google Meet (installed by 25%), Microsoft Teams (17%) and Google Classroom (4%). Families seemed to have different experiences on whether the app installations had gone smoothly, e.g., "[Downloading apps] has gone pretty well, no particular problems with that" (P1), vs., "Yeah, we have installed those apps, and it has been, in the beginning, quite a hassle" (P2). However, none of the interview participants reported that they had not succeeded in installing something that was deemed necessary, and, altogether, the comments revealed that families had managed to organize both hardware and applications for remote schooling as needed.

The use of ICT technology had set also other challenges, including the parent's new role as technical support. The majority of survey respondents (67%) had needed to provide technical support to their children more than once per week. For 43% of respondents this was required once a day or more often. Switching to remote

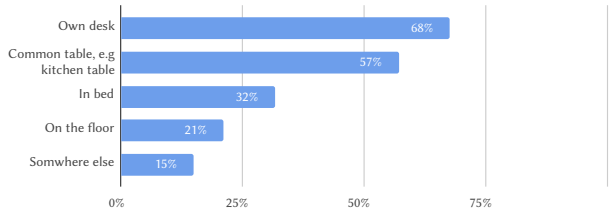

Figure 3: Percentage of online survey respondents (n=114): ICT usage location for remote schooling. Multiple choices allowed.

school had created pressure for parents to be more up to date with technology, and some interview participants verbalized how this had caused stress. For example, one interviewee commenting "I don't have the nerves to endure this kind of inventing multiple passwords and such" (P2), and, "My mind gets muddled if something fails, and then everything gets messed up. Yes it has been surprisingly stressful for me. A small stress throughout the whole school day" (P10). Occasionally it just got too much, "Sometimes you have to go to the backyard to shout, because yes, it brings out those feelings of both good and bad" (P13).

4.2 Usage Context

4.2.1 Space Usage. The survey responses related to the physical context of the remote schooling exposed the practicalities and dynamics of the family work days. For most survey respondents, the school work with ICT equipment was done in multiple places (Figures 1 and 3). Almost all (97%) respondents used a table of sorts, with 68% using the child's own desk and 57% a shared table, such as a dining room table. Less ergonomic usage locations included in bed (31%), on the floor (21%) and on the sofa (11%).

For exactly half of the survey respondents (50%), the remote schooling had affected their use of shared family space, e.g. requiring moving furniture around to accommodate the schooling, or dedicating certain areas for the school work. The organization of the use of physical spaces of the home to support remote school and work was a common theme, with respondents having applied a range of different solutions. Overall the situation was well summed up by one respondent, "It seems like the entire home would be a school" (R28). Considering the young age group of the school children in question, it is not surprising that rather than being alone in their bedroom, "The child wants to work there, where the adults are"(R45). For many, the kitchen (table) had become the main schooling location, e.g., "The kitchen is now a classroom 9am to 1pm... I have to organize my meetings, teaching and calls to the bedroom"(R1). Also in the interviews, the kitchen or living room table, located at a central spot in the house, was a common location for remote schooling. It was perceived as a place where the parent could easily keep an eye on the school work and provide support when needed, e.g., "When he is here in the living room, I can hear for instance if there is a problem with the microphone or something. So then I can help him" (P5).

4.2.2 Quiet and Separation for Video Calls. Overall, the general challenges of noise were noted by survey respondents, e.g., "In every room someone is studying, this limits freedom and one must be wary of causing commotion" (R37). Particularly, creating suitable spaces for, often multiple simultaneous, video calls was highlighted as a common challenge, e.g., "If 3 or 4 people in the family are in video or phone calls, the voices echo around the house. We have to think about who is in which room, so not to disturb the others"(R6). Even when using headphones a quiet space was still sought, "Each worker should find a quiet nook, even if headphones are used" (R35). As well as audible interference, the avoidance of any visible background activity in video was also noted, "For video calling we try to organize a quiet space / corner without background interference (sound and picture)" (R111). The prevention of disturbance links to the following theme (Section 4.2.3), of how families dynamically used and reorganized the home space.

4.2.3 Dynamic Reorganization of the Space. A clear theme arising from the survey was that the use of space in the home was not static, but needed to change during the day. For example, respondents commented, "Sometimes someone needs a desktop computer, in which case the other one has to move elsewhere, etc" (R16), and, "The children have video meetings in the kitchen, so when they are running, the kitchen is out of use for the rest of us. My working from home is in the living room (R13)". Also, interview participants reflected on the same theme, e.g., "[The children do school work] in practice at the kitchen table or on the living room sofa. [...] They both have a video call meeting at ten, so of course then one is in another room. [...] If I am also doing a remote work day, I also have some remote meetings. But of course I know when they are taking place, and then I divide the kids according to that to different rooms" (P2). Similar reorganization was made, "If my partner has his own remote meetings at the same time, he goes to elsewhere [to another room] for that time. But not otherwise. Things have gone quite smoothly, we haven't had to give way to others an awful lot. Only at the simultaneous remote meetings, then we move to different rooms" (P1).

Others had adopted a week vs. weekend reorganization of the space at home. This was commented related to the use of the common family space: "During the week the kitchen table, which is now in the living room, is covered with textbooks. Finally, we clean up at the weekend when the school is out" (R87). Interviewees had implemented a similar division, "Our kitchen table is the school desk. It has been completely overtaken by that purpose from Monday to Friday, and cleaned for the weekend" (P5).

4.3 Reconfiguring Family Schedules

4.3.1 Family Daily Schedule Adjustments. As well as modifications to the physical spaces of the home, remote schooling required respondents to adjust the timing of family activities. For example, due to limited space availability, "When I'm taking care of one child at the kitchen table, and the others give us some peace, then tasks of other children, such as arts and crafts, paintings, etc. can not happen at the same time" (R23). Some reported adjusting mealtimes to fit in with the school and work schedules, "Organization of mealtimes and silent times for meetings"(R20). Overall, respondents gave a sense that they had adapted their daily routines to fit the new requirements, exemplified by, "There is not enough time to do your full work day ... and handle the challenges of remote school. On the other hand, everyday life has now formed a rhythm and rules, so let's go with these" (R1).

4.3.2 Adjusting the Parents' Work. As well as remote schooling, COVID-19 also resulted in the requirement for home working whenever possible. However, in some occupations it was still required to work outside home. The interviewees revealed that such parents aimed to be present during the remote school days as much as possible, and had made special shift arrangements with their employers to do so, "I aim to have days off [from work]. I always work a longer shifts at a time, and then there are longer periods off" (P2), and, "I told my employer that now I will only work evenings, and it has indeed succeeded. My employer has postponed all my shifts to the evening" (P3). Special arrangements made with employers also included decisions to utilize part-time working or vacation days in order to stay home alongside remote schooling children. One participant commenting, "I used to do 100% working time, now I opted for 60% to make this [remote schooling] work" (P7).

Also, parents who worked remotely modified their working schedules to be able to help their child's remote schooling, or, on the other hand, to maximize their own ability to concentrate on work. Many participants reported utilizing flexibility in their working hours, e.g., "I can adjust my work so that I can do it either in the morning, in the evening, at night, or during the day" (P5). In particular, balancing the remote schooling and remote working required scheduling work-related online meetings in an optimal way. One participant stating, "I try to arrange all such Teams meetings and others for the afternoon [after school hours], just because I know that then you can be more at ease" (P5). In addition, the participants described staggering their work, so that parents could take turns in helping the kids and concentrating on work, resulting in, e.g., evening working. An interviewee describing the evolution, "At first, it was a bit impossible, trying to think about how to get them all [work and remote school] combined. [...] quite a lot of work is done in the evening after the school day or after the other parent finishes work. You can't really do everything at once. It really made it easier when you realized you can continue your workday in the evening" (P8). Survey participants had also adopted the same solution, "We take it in turns to be the school parent on alternate days, so the other can do some work. The one who handles the school, then does their work after school until midnight"(R43).

Participants admitted that there were challenges to get into the work mode and concentrate in the home office, "It has been a challenging situation that when you are at home, you can't connect to such a way of working. Maybe you can concentrate for a quarter of an hour, and then someone taps you on your shoulder" (P5). The working arrangements were challenged by the overall situation at home too, especially in families with children under school age, "We have children under school age and my spouse has a really hard time in doing his work" (P7). In the given circumstances, the participants seized the opportunity to retreat to their own peace, or to escape to the office if possible. For example a participant commenting, "When you alternate those days [parents take turns to work], you can then be in the office room [at home]. My spouse has even visited the office outside home" (P13). Some respondents

admitted that they were not able to complete all of their work, "We have the solution that only one parent can make full time work remotely, even if both are officially working. We have attempted to divide so that the other can handle their duties, but the full amount of work can't be done" (R35).

4.3.3 Flexibility in Schooling Schedules. Even though parents made efforts to reorganize their work and family life around the remote schooling, the setting had also allowed some flexibility the schedule of school activities. In many of the interviewed families the school schedule was less rigid, e.g. so that only the video meetings with the teacher or class were at fixed times or generally less frequently. This flexibility was appreciated by the parents, allowing them to adjust the school rhythm so that the timetables matched better with the family routines, e.g., "The school started at nine. So I messaged to the teacher that hey, we can't [start], I am not in my full senses at nine... I explained the situation, that I am working a night shift and the kid is sleeping until I wake him up, so that I can sleep too. So our morning starts after ten, after we get breakfast done and all" (P3). Another commenting, "And when you don't have to be every hour [present online], we can go outdoors in the morning in peace, and then come back to eat and do the [school] work" (P7).

The flexibility in schooling schedules combined with the extensive technology use also raised some concerns from the parents. As the school children had smartphones in active use continuously during the school day, survey respondents highlighted the ease (and lack of visibility) with which their children diverted to entertainment applications, commenting, e.g., "At times it has been difficult to stop the use of entertainment between schoolwork" (R69). As a consequence, parental control of the child's screen time had become impossible, "...the total time spent on the phone is a terrible lot, and it is difficult to limit what they are doing and for how long" (R118).

5 DISCUSSION

As a discussion we draw together the various themes opened by our research findings, highlighting the need for parental juggling, the high intensity of ICT use, and the requirements set by the speed of the transition to remote schooling. Finally, we discuss the limitations of our work and highlight opportunities for future research.

5.1 Remote Schooling Requires Parental Juggling

It was evident from the online survey and particularly from the interviews, that remote schooling at home has required much reconfiguration and juggling of different things by parents and within families. Parents tried to modify their work hours and work in shifts, in order to be present with their children for the school day. They tried to match their work schedules and negotiate, both with their workplace as well as with the other parent, to ensure their presence and support for the remote schooling of children at home. This was demonstrated through, e.g., scheduling work meetings to less busy times with the children, and, in the families with two parents working, taking turns to concentrate on work. It is important to also reflect on the employers' reportedly positive response to such requests for flexibility, providing implicit support to home schooling in the exceptional situation. This is an important requirement on a societal level, and is something that deserves wider public discussion going forwards.

Although the parents' remote work was not in the scope of our research as such, our data shows that juggling between the newly set home life and working from home was at times challenging. The factors affecting this were, e.g., interruptions caused by children's needs for support in school tasks, computing tools, organizing breaks or lunch, and for sharing ICT tools. Sharing the same physical location created the potential for background noise, and the need for frequent changes from one room to another. Davidoff et al. [4] studied family coordination in dual-income families, focusing on parents driving children to school and hobbies, and reported that any deviation from routine easily causes the complete collapse of busy family schedules. Such a collapse has now happened in families in the context of remote schooling, where families were suddenly required to organize many aspects of their daily lives in a new way. Our datasets give insights into how new routines were sought, established and built on over time, in order to run family life smoothly with increased focus on schooling and work tasks.

5.2 Intensive Use of ICT Tools

Not surprisingly, the remote schooling included a vast amount of ICT use. In Finland, according to the EU Kids Online 2020 report [39], 97% of children have access to a smartphone, with most having their own, and 80% of pupils at upper comprehensive schools are online multiple times a day. Consequently, the children in our sample were already quite familiar with the idea of using technology. As a result, the technology-intensive approach to remote schooling that was adopted, seemed to be taken as the norm by families, and, according to our findings, families adapted well to its ICT requirements. However, remote schooling had required family actions in setting up the ICT tools, ranging from the common action of installing applications, to the less common laptop purchase (according to the survey, 75 % and 5%, respectively). This step of setting up the technology infrastructure was the cause of struggle and stress in many families, even though the actions were successfully concluded. It should still be noted, that the requirements to handle the technology easily puts families and children in unequal positions, based on the family finances and parents' experience, interest and skills with technology. This is a point which should be taken into account if, or when, remote schooling schemes are activated in the future society. Also, our results also highlighted how differences between the parents' technology skills may cause a perception of inequality or friction within the family.

It is interesting to note, that family rules around smartphone use and e.g. the use of screen time applications (e.g. Apple Screen Time) to limit children's use, became difficult to a apply in the new context of remote schooling. Managing and restricting screen time is already a complex issue within families [25], and with ICT intensive remote schooling, the amount of time spent in front of a screen skyrockets. In addition, the simultaneous activation of social distancing during the COVID-19 pandemic time, made social media and smartphones almost the only channel through which children can socialize with friends. Related to smartphone use, Hiniker et al. concluded that families often struggle to live up to their own ideals in regard of contextually appropriate technology use [19].

We believe that, with this new context, fundamentally revisiting the whole issue of technology use and overuse in families would be an interesting direction for future research.

5.3 Rapid Transition to Remote Schooling

The COVID-19 pandemic caused a very rapid transition to remote schooling in Finland, and this hurry manifested as the use of ad hoc solutions and in the wide variety of practices that took place, particularly at the beginning of the remote schooling period. The level of preparedness in families varied, e.g. with the availability of equipment and internet connection speed. Our dataset also revealed how changes were rapidly made to improve the situation, purchasing or borrowing ICT tools, such as laptops or upgrading the internet connection. Parents also reflected on how some of the practices, both from the school and family side, were improved over time. Clearly, moving to heavily ICT based education requires also new approaches from teachers, many of which have been addressed by prior work, e.g., Hennessy reported on the pedagogical evolution required by teachers integrating ICT supported learning [16].

The rapid transition to remote schooling also meant reorganization of family spaces, as reported by approximately half of the families we questioned. However, even though families had created a space dedicated to the children's school work, e.g. in their room or on the kitchen table, a considerable amount of technology usage was still reported to happen in other places, such as on the sofa or bed. Clearly this is not optimal for work ergonomics. Earlier research on 10-17 year old's laptop use has also reported on the use of various locations and postures, with 60% of participants reporting discomfort in laptop use [15]. With a longer preparation time for remote schooling it would be important to provide families with guidance also on the ergonomic aspects of the remote school work.

5.4 Limitations of the Study and Future Opportunities

We acknowledge that the transferability of our research is potentially limited by its geographical location and cultural environment. Finland profiles as a country with a high level of technology adoption. Thus, even the lower grades of school children are already typically quite comfortable using ICT tools. We still believe that many of our findings reflect common experiences in families on the rapid transfer to remote schooling that was in progress in many countries at the time of writing of this article. Another limitation arises from the research methods employed, an online survey and interviews. Here, we were glad to notice that engagement with the online survey was very high, indicated by the number and quality of answers received in the survey's optional text fields. We acknowledge that there may be positive bias, particularly in the interviews, when a parent describes their child's school time activities. For example, children playing video games when they were supposed to be doing school work and challenges in limiting screen time, were only reported in survey responses. We believe that by combining the two research methods, we managed to find a good balance and gain both breadth and depth in our findings. We also note that our volunteer based sample selection method probably did not reach the families suffering from the harshest difficulties. More focused research is needed to explore issues within this segment.

Our research opens up a range of possibilities for future researchers to continue to investigate the identified themes. For instance, the parent's experiences in work-home life balance deserve investigating in more detail, as well as the children's use of technology and screen time, and family coordination practices. In our research, we have not focused on the pedagogical aspects or educational content of the remote schooling, which naturally is a huge research area in its own right. The remote schooling, which came as a forced, large scale experiment on the nation, also opens future possibilities for societies and education systems to develop further. For example, whilst classroom based education is paced by the teacher, the remote learning during the COVID-19 pandemic exposes new opportunities and challenges for student self-pacing. We believe that the reported experiences and lessons learned offer valuable information when future remote schooling practices are planned.

6 CONCLUSION

In this paper, we have presented the findings of a study investigating Finnish parents' perceptions on remote schooling, especially related to ICT technology usage, during the spring 2020 COVID-19 pandemic. Based on a combined dataset from an online survey (n = 114) and interviews (n = 14) we report on the intensive adoption and use of ICT technology. Our findings provide insight to the challenges faced by parents, juggling work and family commitments to provide children with the needed support and presence during the remote schooling. Spatial issues within the remote schooling home are also challenging, often requiring family members to continuously move between different rooms during the work/school day, and leading to dynamic reorganization of the family space. Despite needing to reconfigure many aspects of their everyday family life, the general perception from our research is that the families had successfully managed to adapt to the remote schooling context.

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