Education in the Covid-19 Era

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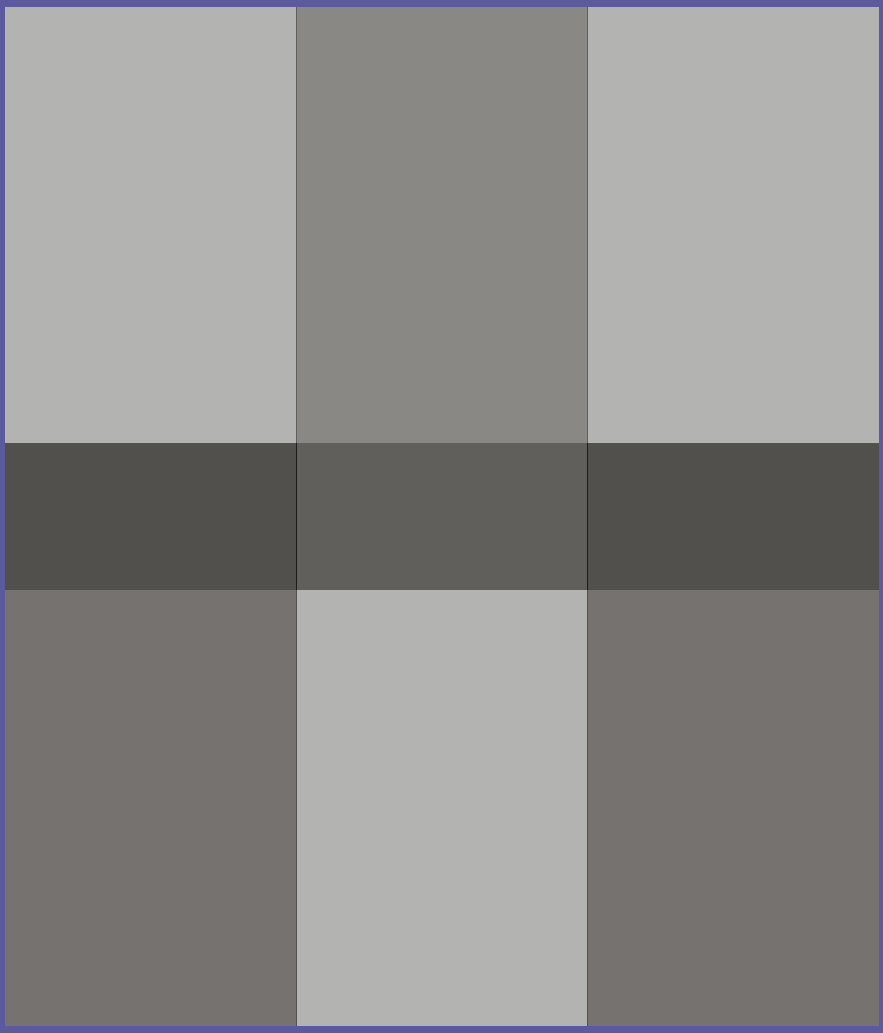

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C·E·P·S *Journal*

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In 2001, the Centre for Educational Policy Studies (CEPS; see http://ceps.pef.uni-lj.si) was established within the Faculty of Education to build upon experience acquired in the broad reform of the national educational system during the period of social transition in the 1990s, to upgrade expertise and to strengthen international cooperation. CEPS has established a number of fruitful contacts, both in the region – particularly with similar institutions in the countries of the Western Balkans – and with interested partners in EU member states and worldwide.

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Revija je namenjena obravnavanju naslednjih področij: poučevanje, učenje, vzgoja in izobraževanje, socialna pedagogika, specialna in rehabilitacijska pedagogika, predšolska pedagogika, edukacijske politike, supervizija, poučevanje slovenskega jezika in književnosti, poučevanje matematike, računalništva, naravoslovja in tehnike, poučevanje družboslovja in humanistike, poučevanje na področju umetnosti, visokošolsko izobraževanje in izobraževanje odraslih. Poseben poudarek bo namenjen izobraževanju učiteljev in spodbujanju njihovega profesionalnega razvoja.

V reviji so objavljeni znanstveni prispevki, in sicer teoretični prispevki in prispevki, v katerih so predstavljeni rezultati kvantitavnih in kvalitativnih empiričnih raziskav. Še posebej poudarjen je pomen komparativnih raziskav.

Revija izide štirikrat letno. Številke so tematsko opredeljene, v njih pa je prostor tudi za netematske prispevke in predstavitve ter recenzije novih publikacij.

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Education in the Covid-19 Era

"We will find a way or we will make it": Facing the Challenges of the Pandemic in Education

A huge number of scientific journals in the world are rightly dedicated to the impact of the Covid-19 pandemic on education. Regardless of the level of development of the country and the level of digitalisation in education, all countries found themselves in a situation for which they were not prepared. Of course, the situation was much more difficult in those countries that did not have well-developed basic preconditions for dealing with full online teaching (infrastructure, internet connection, digitally literate teachers and students, good cooperation with parents, etc.). The response of education to such circumstances is extremely important, both because of the number of students and teachers who have faced the challenge and due to the generality of the phenomenon and the strength of the impact. There have been huge changes in education: in the organisation of schooling at all educational levels, in communication between teachers and students, and in the realisation of the teaching and learning process.

This special issue of the CEPS Journal aims to make room for new experiences and insights, to define challenges and exchange experiences, and to analyse the factors that have influenced education and the ways – coping strategies – for dealing with "educational stress" in the given circumstances. The aim of the special issue is to analyse the experiences of different countries, different socio-cultural contexts and different subjects, as well as the different perceptions of teachers, students, parents and institutions, in order to gain insights into and better understand the process of education in crisis circumstances. However, we are well aware that after the pandemic subsides, nothing will be exactly the same as in pre-pandemic education.

Defining a problem is half the solution, so asking the right questions is just as important as giving answers. That is why we are very happy that this special issue raises both general questions about the educational crisis and questions about the future of education, what it will look like in the post-Covid era. Such questions are crucial because they force us to look at things from a meta-position and to try to cope with change, not just suffer its consequences. The first block of texts is of this nature: they help to provide the "big picture". This block contains five texts that we can characterise as complementary. Each of them looks at the impact of the Covid-19 pandemic on education, but from different angles and from different levels.

Block One:
Where are we in the vortex of pandemic challenges in education?

The block opens with a text by Professor Emeritus Lorin W. Anderson: *Schooling Interrupted: Educating Children and Youth in the Covid-19 Era*. By the start of the 2020, pandemic research studies on the use and effectiveness of distance education had focused almost exclusively on higher education, with a negligibly small number of studies related to primary education, such as K12 education. This paper provides an overview of the findings of the latest "emergency remote teaching" (ERT) research in K-12 education and how it has affected students. Unfortunately, there is a lot of evidence all over the world that school closures have had negative effects on student learning. New terms have emerged, such as "Covid slide" or "learning loss", which clearly indicate a significant reduction in existing knowledge and a large loss in school effectiveness (according to a World Bank analysis, this represents from three to nine months of loss per school year). In addition, there is evidence of an increase in disengagement (student attendance has decreased, with roughly twice the level as before school closures), mental health problems and other indicators that students are endangered by the crisis. All of the effects of the pandemic are much greater among socio-culturally vulnerable groups of children and youth (poor, racial and ethnic minority students, children with disabilities, children in rural areas and foster care, homeless children and migrants).

The article *The Covid-19 Learning Crisis as a Challenge and an Opportunity for Schools: An Evidence Review and Conceptual Synthesis of Research-Based Tools for Sustainable Change*, by Riikka Hofmann, Gabrielle Arenge, Siobhan Dickens, Javiera Marfan, Mairead Ryan, Ngee Derk Tiong, Bhaveet Radia and Lenka Janik Blaskova, logically continues the consideration begun in the previous paper. The authors applied cultural-historical activity theory to reinterpret evidence on widespread learning loss and increasing educational inequities resulting from the pandemic. In fact, they reframe the risk into possibility, identifying scalable transformative learning opportunities. Schools are seen as transformative agencies, change agents capable of transforming local practice to address the global challenges arising from the pandemic. The authors develop "a problem space map" to enable educators to address local challenges. This map is then integrated with research on tool-mediated professional change in order to identify conceptual tools to capture learning gaps and implement pedagogic interventions at scale, thus enhancing schools' agency in addressing the crisis. On this basis, alternative futures for equitable learning in school are generated. The authors discuss the Covid-19 educational crisis as a unique

stimulus for professional learning and outline the potential for durable shifts in educational thinking and practice beyond the pandemic.

The next article, Keith S. Taber's *The Challenge to Educational Reforms during a Global Emergency: The Case of Progressive Science Education,* delves deeper into the nature of these negative effects of the pandemic on education. Based on the example of teaching natural sciences, the author points out a very important finding: in this crisis, progressive elements in teaching are more endangered than traditional elements. The implications of this finding are serious. There is a double challenge: firstly, how to incorporate innovation into education, and secondly, how to make innovation a common practice, a core element of good teaching, not a "luxury" in teaching. How teachers see these progressive elements is extremely important. In the present text, the elements are those related to pedagogy (responding to learners 'alternative conceptions) and those related to the curriculum (teaching about the nature of science). In the ERT situation, new, progressive elements are often seen by teachers as 'extras' rather than 'core' features of practice, as more complex and demanding objectives that are not a priority in crisis management. If innovations are not a natural part of regular teaching practice, if they are not embedded in the essence of the teaching/learning process, they will not survive during a period of emergency. The direct consequence of this is a reduction in the quality of teaching in ERT. If we transfer this finding to the context of less developed countries, then the risk of declining quality of teaching/learning is even greater, because it combines various unfavourable factors (lack of infrastructure for quality online teaching for all students, not enough digitally competent teachers and students to work in the online environment, teaching content and methods of work that are not adapted to new conditions, etc).

All of the issues raised in the previous articles must also be viewed more broadly, e.g., in the light of EU education policy, as the next article has done. *The EU's Education Policy Response to the Covid-19 Pandemic: A Discourse and Content Analysis*, by Vasileios Symeonidis, Denis Francesconi and Evi Agostini, is a critical conceptual analysis of the EU's systemic reaction to a socioeconomic and environmental crisis that carries a number of dilemmas for education systems. Selected European Union policy papers focused on employment and economic priorities are subjected to an analysis of the narratives used in them (e.g., "education recovery"), focusing on the theoretical and ethical implications and the intended outcomes of the narratives. The serious question of "Educating for (whose) success" (McGregor, 2009) is raised, i.e., problems of schooling in an age of neoliberalism. The main aim of the analysis is to look ahead to a renewal of the European ethical framework towards a responsible

(ethics of responsibility) and sustainable developmental model. The authors emphasise the importance of a lot of "balancing acts" between neoliberal and very much interventionist approaches, and several compensatory and corrective social measures taken by the EU. According to the authors, in spite of the fact that all of the analysed texts share the common objective that recovery should ensure social fairness and inclusiveness, investing in people is still predominantly conceptualised as a growth and competitiveness factor, and only secondarily as a key instrument for social inclusion. A dramatic crisis like the Covid-19 pandemic should lead to dramatic and radical changes, including organisational change, fundamental human and ecological values, and a strong axiological framework. With these changes, the European education area could become an important agent in creating a new "Social Europe".

Education policy measures to provide education during the Covid-19 pandemic were, as a rule, influenced by political and economic ideology, which directly influences the decisions made. Spain is a real example of this, as shown in the text *Educational Policies During the Lockdown: Measures in Spain after Covid-19* by E Enrique-Javier Díez-Gutiérrez and Katherine Gajardo Espinoza. The Autonomous Communities of Spain differ in their approach to education in the Covid-19 pandemic. An analysis of their reference educational crisis documents shows that they are influenced by their dominant politics. There are significant differences between conservative and progressive regions, with the latter being more inclined to implement the recommendations of relevant international organisations (e.g., UNESCO, UNICEF, UN, World Bank). This case provides another example of the fact that education is shaped by a specific sociocultural and economic context.

Second block: The views of teachers, students and parents on the pandemic educational experience

The second block contains texts that present findings on the educational experiences of teachers, students and parents in the new Covid-19 circumstances. Teachers at all levels had the most difficult task due to the sudden radical changes caused by the closure of schools and the transition to ERT. They were all caught unprepared, but they had to adjust quickly despite all of the difficulties they faced in this endeavour. Before the pandemic, the use of IC technology in teaching was much more prevalent in higher education than in primary or secondary education. When we look at the research findings, however, it is clear that all teachers faced the same problems: they all needed help in moving

to distance education and reorganising their teaching into a new framework.

This block contains papers on the perception of ERT by teachers, students and/or parents: Faik Özgür Karataş, Sevil Akaygun, Suat Çelik, Mehmet Kokoç and Sevgi Nur Yılmaz, *Challenge Accepted: Experiences of Turkish Faculty Members at the Time of Emergency Remote Teaching*; Tiina Korhonen, Leenu Juurola, Laura Salo and Johanna Airaksinen, *Digitisation or Digitalisation: Diverse Practices of the Distance Education Period in Finland*; Tijana Jokić Zorkić, Katarina Mićić and Tünde Kovács Cerović, *Lost Trust? The Experiences of Teachers and Students during Schooling Disrupted by the Covid-19 Pandemic*; Toni Mäkipää, Kaisa Hahl and Milla Luodonpää-Manni, *Teachers' Perceptions of Assessment and Feedback Practices in Finland's Foreign Language Classes During the Covid-19 Pandemic*; Mojca Juriševič, Lana Lavrih, Amela Lišić, Neža Podlogar and Urška Žerak, *Higher Education Students' Experience of Emergency Remote Teaching during the Covid-19 Pandemic in Relation to Self-Regulation and Positivity*; and Melita Puklek Levpušček and Luka Uršič, *Slovenian Parents' Views on Emergency Remote Schooling during the First Wave of the Covid-19 Pandemic*. Among others, the papers provide the following findings:

- Higher educational institutions responded quickly to the new demands, with many of them rapidly adopting an online system, more rapidly than primary and secondary schools. Although the use of ICT in higher education teaching was more frequent, *a huge number of teachers had never taken any form of training regarding online distance education before Covid-19* and encountered remote teaching for the first time.
- *The need for new competencies became very clear*. Teachers who have received the necessary training for distance teaching as part of their work feel more empowered to teach this way than teachers who have not had such training. For the implementation of digital technology in teaching/learning, there is a need for competencies for the use of digital technology (digital literacy), the ability of teachers to act as adaptive innovators, and the "digipedagogical competence of the teachers". The latter (see Korhonen et al.), that is, how to use digital technology to benefit the quality of teaching/learning, becomes a critical success factor in the educational field. We see that with new experience, new terminology is developed (learning loss, digital slide, emergency remote teaching, etc.). In this sense, the difference between the terms *digitisation* and *digitalisation* in education (Korhonen et al.) is particularly interesting. This distinction indicates the essence of the problem in teaching in an online environment: What are the teaching/learning problems that can be solved with these tools? Tools are evolving much faster than understanding

the learning process in a new medium, so the distinction between digitisation and digitalisation has gained in importance.

- *Reducing the quality of socio-emotional aspects of teaching/learning:* less interaction of teachers and students; students were disinterested in classes; teachers had trouble following students' development; teaching was more task-oriented than normal classroom interaction, making it difficult to maintain students' peer interaction; the changes in structural and institutional conditions affected both students' and teachers' expectations of each other, and the incongruence of these expectations fed into feelings of helplessness for both students and teachers, disengagement from learning for students, and the need for repairing and building trust in student-teacher relationships.
- *Evaluation of teaching effects:*
  - Poor teacher performance: many teachers were suspicious about the quality of their remote teaching, with most of them believing that it was not as fruitful as face-to-face teaching.
  - Teachers spent more time for remote teaching than face-to-face teaching; the heavy workload made them mentally and physically more tired than teaching in the classroom (see Petek in the last block).
  - Teaching was more teacher-centred than in the normal classroom.
  - Although remote education was considered very challenging at first, teachers managed to create good practices to be utilised after the era of the Covid-19 pandemic.
  - Online teaching, if carefully designed and individualised, can stimulate additional commitment and interest of students in the subject (see Stibi et al. in the third block).
  - Most teachers believe that students will gain less knowledge or far less knowledge from distance education than they would from education in the classroom. Most parents agree that such schooling provides students with less knowledge, which is also less consolidated (see Puklek Levpušček and Uršič).
  - More attention should be paid to the enhancement of assessment and feedback practices in distance education. Some teachers (in Finland, see Mäkipää, Hahl and Luodonpää-Manni) perceived that assessment and feedback practices were implemented successfully, and that final assessment was realistic and reliable, while many other studies indicate less relevancy of grades obtained online, increased cheating in grading due to the digital environment making cheating easier, and usual assessment formats becoming unfeasible (see

Anderson in the first block, and Matić in the last). Online teaching facilities allow teachers to provide students with more individual feedback.

- Parents of primary school adolescents reported having the most difficulty coordinating work commitments and the remote schooling of their child, and rated emergency remote schooling as more complicated and difficult than traditional classroom instruction.
- Parents also reported more difficulty motivating their child to complete schoolwork at home.
- Parents of high school graduates were most likely to miss personal contact with the teacher and rated emergency remote schooling as more stressful than usual. Parents perceived teachers' remote help to students quite positively.

Third block:
The response of different subjects to the challenges of the pandemic

The third block contains articles focused on teaching various school subjects with the realisation of ERT. As we saw in the previous block, the quality of teaching/learning in ERT was influenced by many factors. One of them is the nature of the subject, that is, the nature of the scientific or artistic discipline to which the subject belongs. Three studies refer to teaching physical education, craft pedagogy and physics education, respectively, that is, to teaching subjects that unavoidably involve practical work, often group work. These articles – Tanja Petrušič and Vesna Štemberger, *Effective Physical Education Distance Learning Models during the Covid-19 Epidemic;* Anna Kouhia, Kaiju Kangas and Sirpa Kokko, *The Effects of Remote Pandemic Education on Crafts Pedagogy: Opportunities, Challenges, and Interaction;* and Ivana Štibi, Mojca Čepič and Jerneja Pavlin, *Physics Teaching in Croatian Elementary and High Schools during the Covid-19 Pandemic* – describe teachers' management of physical education, craft pedagogy and physics education, respectively, which was supposed to convey learning content related to practical joint activities during distance learning. With regard to physical education teachers, the most effective model was the flipped learning teaching model, whereby students were given an overview in advance of the different forms of teacher video recordings. The least effective was independent work carried out by the students according to instructions prepared by the teacher. In the study of craft pedagogy, remote teaching challenges were related to the unequal distribution of craft materials as well as technical and social resources at different levels of education and in various

contexts. This study finds that remote teaching is more teacher-centred and task-oriented than normal classroom interaction. In addition to positive aspects hidden in new experiences and work perspectives, the sudden transition from conventional face-to-face teaching to the remote format had a negative impact on physics teaching in elementary and high schools according to the authors of this study, particularly with regard to students' experimental work, which is an essential part of the subject of physics. The findings show the flexibility and responsiveness of physics teachers, an increase in the teachers' workload, a lack of experimental work, and a lack of teacher knowledge (of ICT) and skills as well as equipment for conducting distance teaching. However, it also emerged that online teaching, if carefully designed and individualised, can motivate students in the subject.

Examples of responses of mathematics and mother tongue teachers to the unexpected challenges are presented in the papers: Ljerka Jukić Matić, *Croatian Mathematics Teachers and Remote Education During Covid-19: What did They Learn?*; and Tomaž Petek, *The Opinion of Slovene (Mother Tongue) Teachers on Distance Learning in Primary Schools*. The results showed that teachers were available to their students, tried not to burden them with (school) work, and provided daily feedback on their work. In addition, teachers complained about academic dishonesty in distance education. Slovenian language teachers at the primary school level generally had a good attitude towards distance learning, emphasising the greater use of e-materials and the opportunity for formative assessment of students. In their opinion, among the biggest problems of distance learning (Slovenian language) are: teaching is far more tedious than classroom teaching, lack of student participation, lack of non-verbal communication resulting in difficulties in understanding, and some technical issues. Most teachers believe that students will gain less or far less knowledge from distance education than they would gain from classroom education.

Instead of a conclusion: Opening new questions

The Covid-19 pandemic has raised serious issues in education and reopened many basic assumptions for consideration. There were very high expectations that learning in an online environment would bring a revolution in education in the twenty-first century, but this revolution has not eventuated (Salomon & Perkins, 1996). To date, there are no definitive research answers on the effects of learning in an online environment, and many new questions related to this have been opened during the pandemic. Our joint efforts should

contribute to improving the understanding of new educational media, revealing their advantages and limitations, and determining how to make the best use of ICT in education. As Hannibal is reported to have said: "We will find a way or we will make it", there is no third option.

Ana Pešikan, Hannele Niemi and Iztok Devetak

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Schooling Interrupted: Educating Children and Youth in the Covid-19 Era

Lorin W. Anderson[1]

Distance education has been practised for generations, although its purpose and form have changed. Correspondence courses, in which students receive instruction via mail and respond with assignments or questions to the instructor, date back to the mid-1800s, if not earlier. As technology changed, so did the nature of distance education. Radio, television, computers, and, most recently, the internet have supported distance education over the years.

Research studies on the use and effectiveness of distance education focus almost exclusively on higher education. A recent research synthesis suggests that fewer than five per cent of the studies have addressed K-12 education. The Covid-19 pandemic, however, has brought distance education into K-12 schools and classrooms. Distance education in the Covid-19 era has been referred to as 'emergency remote teaching' (ERT) because, with little research on which to rely, teachers must improvise quick solutions under less-than-ideal circumstances, a situation that causes many teachers to experience stress.

The purpose of this paper is to address five fundamental questions. First, what problems have K-12 school administrators and teachers faced in implementing ERT? Second, under what conditions has ERT been effective since the advent of the Covid-19 pandemic? Third, what are the strengths of ERT in K-12 schools and classrooms? Fourth, what are the weaknesses of ERT in K-12 schools and classrooms? Fifth, to what extent will lessons learned from ERT influence teaching and learning when the pandemic abates? The paper concludes with a brief set of recommendations. Throughout the paper, the focus is on K-12 education.

Keywords: effect of Covid-19 on children and youth, emergency remote teaching, implementation problems, improving remote teaching and learning, reimagining schooling

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Prekinjeno šolanje: izobraževanje otrok in mladih v dobi covida-19

Lorin W. Anderson

Izobraževanje na daljavo se izvaja že več generacij, čeprav sta se njegov namen in oblika spremenila. Korespondenčni tečaji, pri katerih učenci prejemajo navodila po pošti in odgovarjajo z nalogami ali vprašanji inštruktorju, segajo v sredino 19. stoletja, če ne še bolj v preteklost. S spreminjanjem tehnologije se je spreminjal tudi način izobraževanja na daljavo. Radio, televizija, računalniki in v zadnjem času tudi svetovni splet so z leti podprli izobraževanje na daljavo. Raziskovalne študije o uporabi in učinkovitosti izobraževanja na daljavo se skoraj izključno osredinjajo na visokošolsko izobraževanje. Nedavna sinteza raziskav kaže, da je manj kot pet odstotkov študij obravnavalo t. i. izobraževanje K-12. Zaradi pandemije covida-19 je izobraževanje na daljavo začelo potekati tudi v šolah in učilnicah K-12. Izobraževanje na daljavo med pandemijo covida-19 se imenuje »poučevanje na daljavo v izrednih razmerah«, saj morajo učitelji zaradi pomanjkanja raziskav, na katere bi se lahko oprli, najti hitre rešitve v kar se da neidealnih okoliščinah, kar pri veliko učiteljih povzroča stres. Namen prispevka je odgovoriti na pet temeljnih vprašanj, tj.: s katerimi težavami so se pri izvajanju poučevanja na daljavo v izrednih razmerah srečevali ravnatelji in učitelji; v kakšnih pogojih je bilo poučevanje na daljavo v izrednih razmerah učinkovito od začetka pojava pandemije covida-19; katere so prednosti poučevanja na daljavo v izrednih razmerah v šolah in razredih K-12; katere so slabosti poučevanja na daljavo v izrednih razmerah v šolah in razredih K-12; v kolikšni meri bodo izkušnje, pridobljene pri poučevanju na daljavo v izrednih razmerah, vplivale na poučevanje in učenje, ko se bo pandemija umirila. Prispevek se konča s kratkimi priporočili. V celotnem prispevku je poudarek na izobraževanju K-12.

Ključne besede: učinek covida-19 na otroke in mlade, poučevanje na daljavo v izrednih razmerah, težave pri izvajanju, izboljšanje poučevanja in učenja na daljavo, redefinicija šolstva

Introduction

Distance education has been practised for generations, although its form and purpose have changed over the years. Correspondence courses, in which students receive instruction via mail and respond with assignments or questions to the instructor, date back to the mid-1800s. In the United States in the 1920s and 1930s, radio became a natural medium for extension courses offered to farmers through state agricultural colleges. In the 1950s and 1960s, television supplemented, and sometimes replaced, radio in delivering distance education. By the mid-1970s, personal computers became the darlings of distance education delivery. Internet access, an extension of the scope of personal computers, is now the preferred form of distance education. More recently, the phrase 'remote learning' has replaced the phrase 'distance education.'

Until approximately 2020, systematic study of the use and effectiveness of distance education has focused almost exclusively on higher education. A recent research synthesis suggests that fewer than five per cent of the studies have addressed K-12 education. However, the Covid-19 pandemic (hereafter 'the pandemic') has brought distance education into elementary and secondary schools. Henrietta Fore, executive director of UNICEF, has suggested that the pandemic has created a 'global education emergency' (Hess, 2021). Hodges et al. (2020) refer to distance education in the Covid-19 era as 'emergency remote teaching' (ERT): the rapidity with which the pandemic descended required teachers to improvise quick solutions under less-than-ideal circumstances with little if any research or previous practice on which to rely.

At the pandemic's peak, 1.5 billion students in 188 countries were locked out of their schools (OECD, 2021). In OECD countries, the average length of school closure was seventy days, with considerable variation across countries. Importantly, school closures were longer in countries where students had lower levels of academic performance.

Most countries have made heroic efforts to find ways to deliver instruction during this lockout, many involving some form of remote teaching. The purpose of this paper is to address five fundamental questions. First, what problems have K-12 school administrators and teachers faced in implementing ERT? Second, under what conditions has ERT been effective since the advent of the Covid-19 pandemic? Third, what are the strengths of ERT in K-12 schools and classrooms? Fourth, what are the weaknesses of ERT in K-12 schools and classrooms? Fifth, to what extent will lessons learned from ERT influence teaching and learning when the pandemic abates? The paper concludes with a brief set of recommendations. Throughout the paper, the focus is on K-12 education.

Method

Because the Covid-19 pandemic began sometime in March 2020, the search for relevant studies and commentary focused on Google Scholar and Google. Search terms included 'Covid-19 and education,' 'the impact of Covid-19 on education,' and 'educational accommodations in the Covid-19 era.' Except for a large-scale study conducted jointly by UNESCO, UNICEF, and the World Bank and a meta-analysis conducted by Harry Patrinos from the World Bank, no other multi-national studies were found. Most studies were small and focused on specific jurisdictions (e.g., localities, states, regions). Many of the articles were anecdotal as educators struggled with the changes needed because of the pandemic.

In the interim between the submission of the original manuscript and the submission of the revision of the manuscript, three publications addressing multi-national issues and/or containing multi-national data were located. The first was an update of the UNESCO, UNICEF, and World Bank study, published under the auspices of the OECD. The second was a publication of Save the Children International, which presented survey data from parents, caregivers, and students in 46 countries. The third was a volume edited by Fernando Reimers of Harvard University containing chapters written by educators in thirteen countries. Interesting and importantly, these three sources provided additional data and insights but did not fundamentally change the answers to the five research questions.

Delivering Remote Learning

Once schools were shuttered, educators and legislators had to decide how best to deliver instruction to students. Results from various surveys, both national and international, suggested that, initially, four primary modes of instruction were in place: take-home materials, radio, television, and online platforms. Without computers (or tablets or smartphones) and online connectivity, online platforms are not an option for schools. As expected, then, only two-thirds of schools in low-income countries reported using online platforms, in contrast with 90 to 95 per cent of schools in middle- and high-income countries (UNESCO, UNICEF, and the World Bank, 2020). In Sub-Saharan Africa, 45% of children had no exposure at all to remote learning. Of those who did, it was mostly radio, TV, or written materials. In Latin America, 90% of children received some remote learning, but less than one-half was through the internet. The rest was through radio and/or TV.

The perceived effectiveness of remote learning varies by modality and income group. Globally, online learning platforms were rated as very effective (36%) or fairly effective (58%), particularly among high- and upper-middle-income countries. None of the high-income and only six per cent of upper-middle-income countries rated online learning as ineffective. In low-income countries, take-home instructional materials were rated the least effective among the four modes of instruction (with Ministries of Education in 43% of those countries rating them as 'not effective'). For middle-income and high-income countries, radio received the lowest effectiveness ratings (with between one-fourth and one-third of the countries rating radio as 'not effective').

As schools have begun to reopen, hybrid modes of instruction have been appearing. In the United States, three modes of instruction are reportedly being used: fully remote (60% of K-12 students), hybrid (20%), and fully in-person (20%). A rather typical example of the hybrid mode is attending in-person classes twice a week and remote classes three times a week. For example, half of the students might attend classes in-person on Monday and Tuesday, while the other half would attend classes in-person on Thursday and Friday. Wednesdays are reserved for deep cleaning of each classroom. The division of classes into two groups of students makes it possible to maintain appropriate social distancing within the classroom.

In many states, the decision to return to in-person instruction has not been an easy one. For example, a survey of students and parents in the Chicago, Illinois, public schools conducted in December 2020, suggested that only 37% of students would return to schools if they were reopened for the spring term. In Mississippi, home-schooling by parents has increased by 35% in one year, largely because of parents' disappointment with the remote learning provided by the schools. In some cases, the decision to reopen schools has pitted teachers against parents and government officials. In the state of Florida, for example, the teachers' union has sued the governor over the state's efforts to require schools to return to total in-person instruction. The argument is that teachers should not be forced to go back to their classrooms unless they are completely safe (Goldstein & Shapiro, 2020). In contrast, in North Carolina, a group of parents has sued the local education authority claiming that virtual learning is less effective than in-person learning, thus violating the state's constitution that guarantees students should have an equal opportunity to quality education. Another factor in the parents' lawsuit is that many of them struggle to balance work and childcare while overseeing remote learning (NY Times, 2020).

So, where are we? First, the concept of remote learning is not homogeneous. There are multiple modes of delivering instruction remotely. Second,

because online learning requires technological hardware and internet connectivity, reliance on online learning is likely to discriminate against poor communities and poor countries. In many ways, the pandemic has simply magnified the 'digital divide' that widens inequalities among the 'haves' and the 'have nots.' Third, whether and when to reopen schools is an issue that will likely engender emotion-laden discussions that incorporate concerns for the safety of teachers and students, the social-emotional development of students (particularly younger students), and parents' abilities to balance childcare with work demands.

Effect of Covid-19 on Children and Youth

There is a great deal of anecdotal evidence that the pandemic has profoundly affected education worldwide (Reimers, 2021). We should not be surprised, then, that closing schools has affected children and youth in many ways. Somewhat surprising, however, is that the effect is quite complex.

With respect to the effect on academic learning, numerous articles have been written about the so-called 'Covid slide' (Bielinski et al., 2020; Donnelly & Patrinos, 2020) and 'learning loss' (Dorn et al., 2020). In addition, Kuhfeld et al. (2020) have argued that there is a consensus among researchers that school closings during the pandemic have negatively affected student learning. Unfortunately, this assertation masks the complexity of school closings' impact on student learning.

One problem in understanding this impact is there are two quite different definitions of 'learning loss.' For example, Henrietta Fore, executive director of UNICEF, has argued that a major concern for her agency is the amount that children forget when not in school (cited in Hess, 2021). Similarly, Donnelly and Patrinos (2020) concluded that Kazakhstanian students had experienced a significant *reduction in existing knowledge*. Both assertions imply that students now know less than they did at the beginning of the pandemic.

In contrast, Beth Tarasawa, vice president for research at NWEA, has suggested that the results of a large-scale NWEA study indicate that students kept learning in virtual environments, but they learned less than would be expected based on prior year's data (as quoted in Turner, 2020). Similarly, Dorn, et al (2020) compared the increases in student scores between fall 2019 and fall 2020 with prior fall-to-fall gain scores over a three-year period Learning less than expected is quite different from students forgetting what they have learned. As we shall see, these two different definitions lead to quite different decisions about how to solve the problem of learning loss.

Next, there is the matter of the questionable validity of the data. Because of increased student attrition during the pandemic, the two populations used to compute learning loss are quite different. Specifically, a sizable number of the most vulnerable students (e.g., ethnic and racial minorities, poor children and youth) were not assessed in the most recent round of testing; hence, their achievement is not reflected in the data. One clear implication is that the impact of the pandemic on student achievement is likely underestimated (Kuhfeld et al., 2020).

Speaking of vulnerability, virtually every study conducted in the past six months has found that the effect of the pandemic on vulnerable children and youth is much greater than on more well-to-do children (Adams, 2021; Dorn et al., 2020; Korman et al., 2020; Kufeld et al., 2020; Saavedra, 2021). In addition to poor and racial and ethnic minority children, vulnerable students include children with disabilities, children in foster care, homeless children, and migrants. Gender inequity is another often neglected component of vulnerability (Reimers, 2021). As Fore (cited in Hess, 2020) has stated, many girls will never return to school in communities where girls are expected to take care of family members. Furthermore, one of the lessons learned from the Ebola Crisis of 2015 was that the closure of schools led to an increased risk of sexual exploitation, early pregnancy, and early and forced marriage (Giannini & Albrectsen, 2020).

The results of multiple studies suggest that the effect of the pandemic is greater in mathematics than in reading (Bielinski et al., 2020; Getchell, 2020). Based on these studies learning gains in reading are 63% to 68% of what they normally are on average; learning gains in mathematics are much lower at only 37% to 50% of the average normal school year gains (Kuhfeld & Tarasawa, 2020). The available data, then, suggest that students will have lost the equivalent of three months of learning in mathematics and one-and-a-half months of learning in reading. To make matters worse, the negative impact on mathematics achievement increases across grade levels, K-5 (Dorn et al., 2020). One exception to this generalisation is a large-scale study conducted in India where the loss in language was greater than the loss in mathematics, although the loss in both subjects was staggering (92% and 82%, respectively) (Research Group, Azim Premji Foundation, 2021).

To complicate matters further, obtaining valid and reliable data for the youngest students is quite problematic, particularly when tested remotely. Children in Grades 1 and 2 who were tested remotely in fall 2020 showed large improvements in their percentile rank since fall 2019; while those tested in-person showed patterns more consistent with those of older students (where percentiles stayed the same or decreased (Kuhfeld et al., 2020). These findings suggest

that remote testing may be a qualitatively different experience for the youngest students. One reasonable explanation for this difference between in-person and remote testing results is that parents may be assisting their children on the remote tests (Ferguson, 2020).

The data on the effect of the pandemic on students' mental health are equally, if not more, complex. The titles of two of the cited articles summarise the opposite positions quite nicely: 'In a world "so upside down," the virus in taking a toll on young people's mental health' (Levin, 2020, title); 'Survey reveals children coped well with school closure' (Gray, 2020, title). More has been written about the negative impacts of the pandemic on mental health, describing rising rates of depression, anxiety (Dorn et al., 2020), psychological distress (Ritz et al., 2020), and disengagement (Ferguson, 2020). If you read through the various articles, however, you arrive at two conclusions. First, some students are doing quite well with virtual learning; many are not. Second, those who are not doing well tend to be those who have not done well in in-person classrooms (Christakis, 2020).

The problem facing educators, then, is to differentiate these two groups of students and provide the kind of support and encouragement they need to be successful. To this end, Belinda Ludlam, an assistant headteacher and head of teaching and learning at a large academy in Hampshire, UK, has identified five types of learners based on her experience.

1. These students made their usual progress and revealed no issues. They found a good balance between schoolwork, relaxation, sports, and hobbies during school closure.
2. These students enjoyed not being at school but needed teachers and peers around them to ask or advise them about their work.
3. These students switched off, figurately and literally. They were not worried about school, did little work, and did not have family members urging them to do anything. They did not respond to emails or other digital communications.
4. These students were emotionally affected by not being at school. Without friends and teachers, they were less able to concentrate and did not always complete their work. They were also worried about the pandemic and anxious about its impact on their family.
5. These students were overwhelmed technologically. These barriers came in many forms, with some students trying to access all work on their phones or sharing a single laptop with siblings or parents. Equally, poor-quality broadband connection or limited bandwidth was an issue for some.

One might predict that students in Category 1 are 'coping well,' whereas those in Category 4 are more likely to be anxious and depressed. Within Ludlam's framework, then, the overall picture of students' mental health depends on the percentage of students in each of her categories. The results of a multi-national survey conducted by Save the Children suggested that 83% of children and 89% of parents reported an increase in negative feelings due to the pandemic (Ritz et al., 2020). In contrast, a survey of more than 4,000 students in Great Britain found that only about one-third of the students reported experiencing greater sadness, stress, and worry after the shuttering of the schools (Khan, 2020). What we seem to have here is a bipolar distribution.

There is one area in which there seems to be some general agreement: social development (Beane & Shearer, 2020). Surveys of primary and elementary school children and their parents have found that between 40 and 65 per cent of children are feeling increasingly lonely. Dodd, Lester, and Cartwright-Hatton (2020) estimate that this is an increase of around 40 to 50 per cent compared to previous levels. Ritzet al. (2020) compared their survey results for two groups of children. One group consisted of children who had little (if any) contact with friends; the other group contained children who regularly interacted with their friends. For the first group, 57% were less happy, and 54% were more worried. In contrast, for the second group, less than 5% reported similar feelings. The lack of opportunities for social development is particularly problematic for young school-aged children, ages 5 through 7.

Problems with Remote Schooling

Many of the problems associated with remote schooling are merely exacerbations of problems with in-person schooling (Christakis, 2020). This section will focus on three problems associated with remote schooling: the digital divide, disengagement, and cheating.

The Digital Divide

The so-called 'digital divide' (Junio, 2020; van Dyjk, 2020) is a problem primarily because online learning is the gold standard of remote learning for several reasons. First, online learning is the most interactive of all technologies (i.e., radio, television, written materials, stand-alone computers). Second, online learning provides students with access to a myriad of support software, including learning management platforms (e.g., Canvas, Google Classroom, Kami), communication platforms (e.g., ClassDojo), and content and lesson

delivery platforms (e.g., edpuzzle, SharePlus, and Zearn Math). Third, in the United States and several other countries students are expected to rely on the internet at home to complete and submit assignments (Auxier & Anderson, 2020). In this regard, Lake and Makori (2020) found that two of every five students surveyed had to do their schoolwork on cell phones and use public WiFi to access the internet, putting them at a distinct disadvantage. Finally, and perhaps most importantly, digital inequality reinforces existing social and economic inequality (van Dijk, 2020).

How large is the digital divide in education? In the United States, 35% of lower-income households do not have a high-speed internet connection, in contrast with 6% of upper-income households (Auxier & Anderson, 2020). Among UNESCO member countries, 64% of low-income countries use online platforms compared to 90 to 95 % of middle- and high-income countries (UNESCO, UNICEF, and the World Bank, 2020). In Sub-Saharan Africa, internet access is less than 5 per cent (Asim et al., 2020).

Before moving on, it is important to make one final point. The digital divide is not just about whether students have devices and can connect to the internet. Students whose parents lack the skills or time to help them use the online platform and troubleshoot when needed are also at risk of falling behind.

Disengagement

In her excellent book, *The path to dropping out*, Melissa Roderick (1993) argues that the act of dropping out of school is the culmination of a process of disengagement, beginning with simply not attending. In the Covid-19 era, there is ample evidence that student attendance has decreased (CTV News, 2021). Korman et al. (2020) have labelled this decrease an 'attendance crisis.' Across multiple studies, the estimated decrease in attendance ranges from 15 to 20 per cent, about twice that before schools were closed (Lieberman, 2020). However, the reliability of these data is somewhat suspect since there is no common definition of what it means to be present when schooling is virtual (Kamenetz, 2020). In addition, there are numerous anecdotal reports of students logging into virtual classrooms and then walking away from their computers. These students are likely to be counted as present, not absent (Kamentz, 2020).

If attendance is declining and many students are having difficulty submitting assignments (as mentioned above), it should not be surprising that the grades or marks students receive are also declining. Available data suggest that the percentage of students receiving grades of F, on average, has increased dramatically, ranging from increases of 40 to 80 per cent. Unfortunately, but not

unexpectedly, the increase in F grades is much higher for economically disadvantaged and minority students, approaching 400 per cent (Tomkins, 2020).

Cheating

Although the prevalence of cheating remains elusive, no one doubts that the opportunity for it in virtual schooling is great. With respect to prevalence, some data exist. For example, a study by visualobjects.com revealed that 52% of students anticipated widespread cheating and breaches of academic integrity by their peers in a virtual learning environment (Herlyn 2020). Similarly, cheating has been reported as widespread in Canadian secondary schools (Thomson, 2020).

Computer applications such as LitCharts, Spark Notes, Slader, and Photomath have made cheating much easier. Photomath, for example, scans a mathematics problem and offers a step-by-step guide on how to solve it. Unfortunately, although intended as 'teaching tools,' there is nothing to stop these applications from being used in nefarious ways.

The implications of cheating have been summarised succinctly by Steve Saldin, a faculty member at the University of Idaho. 'One student with a pattern of cheating is an ethical problem for that student. Multiple students with a pattern of cheating devalues any grade or degree they might be receiving. When cheating spreads to many students in many programmes and schools, degrees and grades cease to provide a measure of an individual's preparedness for a profession or position. And perhaps even more importantly, it suggests a society that blindly accepts any means to an end as a given' (cited in Newton, 2020).

Improving Remote Schooling

Even a cursory review of online resources will yield a wide range of suggestions and strategies for improving remote schooling. In this section, I will offer three recommendations: increase access and quality, prioritise a culture of care, and accelerate, do not remediate.

Increase Access and Quality

Virtually every country either has a constitutional guarantee to education or does not have a constitutional guarantee but has ensured that right through an independent statute. Each country has constructed laws around education as a fundamental right of citizens, at least until the age of adulthood.

If schooling is virtual, then, students must be provided a laptop or tablet and a working internet connection (Mehta, 2020).

If every student has an electronic device and reliable access to the internet, and if teachers have experience and training in how to provide high-quality learning experiences online, remote schooling can be extremely effective. In the past several months, individual states and LEAs in the United States have made a Herculean effort to distribute devices, connect students to the internet, and place regulations on remote schooling (Dorn et al., 2020). Recently, the city of Philadelphia (USA) has widened free internet eligibility for families with children in school (Mezzacappa, 2020). As part of the UN Sustainable Development Goals (SDGs), world leaders have committed to strive for universal and affordable access to the internet in least developed countries by 2020, and to ensure that women and men have equal access to basic services, including technology, by 2030. With respect to access, then, goals have been set, strides have been made, but there is a long way to go.

In terms of quality, teachers must understand that remote learning requires a fundamentally different approach to teaching (University of Toronto Libraries, 2021). Because the closing of schools occurred quite rapidly, teachers had little time to plan for teaching remotely. Not surprisingly, then, many teachers continued to teach the way they did in regular classrooms. For the most part this was not successful. Successful teaching within remote schooling requires what may be termed 'assignment-driven instruction.' Examples include 'flipped classrooms' (Barshay. 2020), project-based learning (Mathewson, 2020), and case-based learning (Queen's University Centre for Teaching and Learning, 2021).

In flipped classrooms, students are given one or more questions to answer or problems to solve (the assignment). As 'homework,' which is expected to be completed *prior to, rather than after*, the face-to-face lesson, students are expected to watch a video or explore material that is related to the question(s) or problem(s). This is referred to as the asynchronous phase of instruction since individual students can engage in the assigned activity at any time. During face-to-face time, also known as the synchronous phase, teachers lead a discussion of the question(s) or ask students how they solved the problem(s). This phase is expected to be highly interactive and with students active engaging with the questions or problems assigned.

In project-based learning, students work in groups to complete assignments that require several days, even weeks, to complete. Within online platforms breakout rooms are used by the groups to work together. In project-based learning, teaching of new content is embedded in the projects themselves. That

is, learning the content is a means to an end, not an end itself (Lee, 2020). When project-based learning has been successful, teachers report higher student engagement because the projects captivate students' attention and give them the freedom to work through parts of the assignment at their own pace (Mathewson, 2019). In project-based learning, teachers are expected to facilitate, encourage, support, and inspire.

Finally, with case-based learning students engage in discussions of specific scenarios that resemble or typically are real-world examples (i.e., cases). The method is learner-centred with intense interaction between participants as they build their knowledge and work together in groups to examine the case. The instructor's role is that of a facilitator.

The changes required by 'assignment-driven instruction' are not made easily by many teachers. Consequently, professional development is likely to be needed. Students also may have difficulty adjusting to their new roles. These roles include setting goals for themselves, managing their work, asking questions when they need help, and collaborating with peers (Kelly, 2020). Role playing and/or modelling may be useful initially to help students become more comfortable with these new roles.

Prioritise a Culture of Care

Classrooms that are thriving during the pandemic are ones where teachers have developed strong, positive relationships with their students and built inviting, yet business-like, communities of learning (Heyck-Williams, 2020). For many teachers (and administrators) classroom management is synonymous with classroom control. In virtual classrooms, however, teachers who focus on compliance are struggling without the compulsion that physical schools and classrooms provide (Mehta, 2020).

We have known for some time the importance of the first week or two of school. It is during this time span that students and teachers build relationships, set expectations for learning, and reinforce the routines for behaviour (Sonic Learning, 2020). With remote learning, what happens during the first weeks of school is even more important. This spring I had conversations with two of my granddaughters, ages 13 and 14. Both are in schools that practice totally remote learning. Among the questions I asked them was 'Do you know the students in your class?' The 14-year-old quickly answered 'No.' The 13-year-old said that she only knew those students with whom she worked in breakout groups.

Admittedly, it is not easy to promote a culture of care in virtual classrooms. Nonetheless, it can be done. Some teachers have recreated virtual

bitmoji classrooms (Katz, 2020). The interactive elements of these classrooms allow students to get to know their virtual classmates. Other teachers use Flipgrid (#Flipgridfever), a social learning platform that allows teachers to pose questions intended to help students get to know one another and ask students to respond in a video (Mason, 2020). As a final example, a high school in Wisconsin has reorganised itself so that every adult in the building is responsible for 10 to 15 students. Students can call or text these adults as needed — the equivalent of an on-call adult to help them navigate their virtual classes (Mehta, 2020).

Accelerate, Not Remediate

Earlier, I described two different definitions of learning loss – a 'significant reduction in existing knowledge' vs 'learning less than expected.' I mentioned that the choice of definition leads to quite different strategies for solving the 'learning loss' problem. UNESCO, UNICEF, and the World Bank (2020) asked ministries of education to indicate what approach they would use to limit learning loss in the future. Two of the choices were 'remedial programmes' and 'accelerated programmes.' Across a sample of 135 countries, 43% chose remedial programmes compared to 19% choosing accelerated programmes. The results were quite similar across income groups (low, lower-middle, upper-middle, and high). In a more recent study conducted by OECD (2021), 86% of the countries reported providing remedial measures at the primary school level, 75% did so at the lower-secondary level, and 73% at the upper-secondary level.

Unfortunately, based on a great deal of research, remediation is generally not effective (Boatman & Kane, 2018; Mindsteps, 2017). One explanation is that by focusing on remediation alone, students are constantly facing backwards rather than forwards. The more they are backwards focused, the more they are trying to catch up and keep up simultaneously. Unfortunately, while they are trying to catch up, the curriculum continues to move forward.

Acceleration is an alternative to remediation. Acceleration refers to a wide variety of educational and instructional strategies that are used to advance the learning progress of students who are struggling academically or who have fallen behind, strategies that help these students catch up to their peers as well as perform at the level expected by grade-level learning standards. Acceleration requires that educators adopt the principle of 'less is more,' a principle first articulated a quarter-century ago (Cushman, 1995). Acceleration has two requirements: 1) focusing on the 'essentials' of the curriculum and 2) reducing the amount of time spent on review.

Concerning the first requirement, Mehta (2020) suggests that teams of teachers and administrators could work together to decide what is essential to keep and what can be pared. He argues that we should take a page from the Japanese tidying expert and 'Marie Kondo the curriculum,' discarding the many topics that have accumulated like old souvenirs while retaining essential knowledge and topics that spark joy. Similarly, in describing his recommended teaching strategy, Lee (2020) suggests that we shorten up and focus classes only on critical topics while making the bulk of the material available online in various forms.

With respect to the second requirement, a study conducted by the New Teacher Project (2018) is instructive. In the nearly 1,000 lessons observed, students were working on activities related to class 88 per cent of the time. They met the demands of the assignments 71 per cent of the time, and more than half brought home As and Bs; students only demonstrated mastery of grade-level standards 17 per cent of the time. That gap exists because so few assignments actually gave students a chance to demonstrate grade-level mastery. Of the 180 classroom hours in each core subject - ELA, mathematics, science, and social studies – the study found that students spent 133 hours on assignments that were not grade-appropriate (i.e., appropriate for students in *lower grades*) and 47 hours on assignments that were grade-appropriate. They concluded that would be the equivalent of more than six months of lost learning time in a single school year.

Finally, the transition to acceleration has implications for assessment and evaluation. Educators and policymakers should rely on Rate of Improvement (ROI) as a key metric when monitoring learning progress. While norms will still be valid and important, growth will be a more significant indicator of student success and risk (Bielinski et al., 2020).

The Future of Education Beyond Covid-19

'As we muddle through the Covid-19 era yearning for a return to something close to normal, we shouldn't squander this occasion to imagine how much better 'normal' could be' (Christakis, 2020, last para.). Andreas Schleicher, head of education at the OECD, has described the pandemic as creating a 'great moment' for learning (OECD, 2021). Likewise, Michael Fullan and his colleagues have asserted that the pandemic has presented us with an unprecedented opportunity to reimagine and transform education. Fullan, Quinn, Drummy, and Gardner (2020) have argued that we are in Phase 2 of a three-phase process. Phase 1 began with the disruption caused by the pandemic, the

closing of schools, and the rapid shift to remote learning. Phase 2, labelled Transition, concerns the planning for reopening while the pandemic is still creating uncertainty. In Phase 3, labelled Reimagining, we will need to lay out a vision for an educational approach that enables all students to thrive and prepares them with skills to navigate ambiguity and change. Finally, phase 3 will require drawing from the best of traditional approaches, innovative practices, and insights from remote learning to shape new, flexible, agile hybrid learning models. In this section, I will briefly outline four things we should expect to see post-pandemic.

1. The digital divide will close at a much faster rate than it has in the past. Technology will be critical to make systems more resilient and provide a continued educational experience at home and at school (Saavedra, 2021). However, closing the digital divide will not be cheap. It is a challenge for both ministries of education and ministries of finance to define the investment path that is needed in the coming years to provide a minimally decent service for all children and youth. A renewed social contract and a political commitment to invest in what is needed to provide the right opportunities to all is unavoidable (Saavedra, 2021).
2. Educational technology will be an integral component of reimaging schools. However, because education is, at its heart, about human connections – between students, teachers, parents, caregivers, principals, and broader communities – criteria for the selection and use of technology will be established. The World Bank (2020a, 2020b) has suggested that the selection and use of educational technology should be guided by a clear purpose with a focus on educational objectives; reach all learners; engage an ecosystem of partners; and rigorously and routinely use data to learn what strategies, policies, and programmes are effective in maximising student learning.
3. Parents will be part of the solution. During the pandemic, teachers and families have navigated the dynamics of a new world in which parents have a front-row seat to their children's education. Instead of school being a black box, parents can watch their children and their children's teachers every minute of the day if they choose to do so. Parents have come to a new understanding of what they can do to support their children's education and the immense influence that teachers have in the lives of children. In a reimagined education world, parents, teachers, and authorities must cooperate and reach a balance to minimise negative health and education impacts (Arundel, 2020b).

4. We must prepare for future shocks by building back better. It is not only imperative that we recover from the pandemic but that we use this experience to become better prepared for future crises. The Covid-19 pandemic is not the first crisis to affect education, nor will it be the last. What is meant by 'building back better?' Schools should be better prepared to switch easily between face-to-face and remote learning as needed. Teachers must be better equipped to manage a wide range of IT devices in the event of a future lockdown. Curricula must be sufficiently flexible to be delivered in person or online. The future education system must not be subject to lost learning during the next crisis affecting education. We must be prepared! As we prepare for future shocks, we would be wise to consult the Inter-agency Network for Education in Emergencies (inee.org). The mission of the Network, which has 20 years of experience from which to draw, is to ensure the right to a quality, safe, and relevant education for all who live in emergency and crisis contexts through prevention, preparedness, response, and recovery.

As we exit the pandemic, we would be wise to attend to Andreas Schleicher's perspective on the future of education. Schleicher, Special Advisor on Educational Policy for the Secretary-General, has suggested that 'countries need to use the momentum to reconfigure learning environments to educate learners for their future, not our past. [...] Effective learning out of school during the pandemic placed much greater demands on autonomy, capacity for independent learning, executive functioning, and self-monitoring. The plans to return to school need to focus on more intentional efforts to cultivate those essential skills among all students' (OECD, 2021, p. 5).

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Biographical note

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The Covid-19 Learning Crisis as a Challenge and an Opportunity for Schools: An Evidence Review and Conceptual Synthesis of Research-Based Tools for Sustainable Change

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This paper advances our understanding of how schools can become change agents capable of transforming local practice to address the challenges arising from the Covid-19 pandemic. It presents a novel application of cultural-historical activity theory to reinterpret evidence on widespread learning loss and increasing educational inequities resulting from the pandemic, and to identify scalable transformative learning opportunities through reframing the crisis as a double stimulation. By reviewing evidence of the emerging educational landscape, we first develop a picture of the new 'problem space' upon which schools must act. We develop a problem space map to serve as the first stimulus to articulate local challenges. Integrating this problem space with research on professional change, we identify conceptual tools to capture learning gaps and implement pedagogic interventions at scale, in order to enhance schools' agency in directly addressing the crisis. These tools can act as the second stimulus, enabling educators to address local challenges. We conclude by discussing the Covid-19 educational crisis as a unique stimulus for professional learning and outline the potential for durable shifts in educational thinking and practice beyond the pandemic. We argue that this unprecedented historic disruption can be harnessed as a transformative professional learning opportunity. In particular, we consider how research on professional change offers local, scalable interventions and tools that can support educators in preventing the new insights from 'slipping away' post-pandemic. Utilising the notions of boundaries and tool-mediated professional change, we examine the ways in which

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this disruption generates opportunities to envision alternative futures for equitable learning in school.

Keywords: Covid-19, learning loss, cultural-historical activity theory, implementation, transformative agency

Kriza učenja v obdobju covida-19 kot izziv in priložnost za šole: pregled dokazov in konceptualna sinteza na raziskavah temelječih orodij za trajnostne spremembe

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Prispevek poglablja naše razumevanje, kako lahko šole postanejo nosilke sprememb, ki lahko preoblikujejo lokalno prakso, da bi se tako spoprijele z izzivi, ki izhajajo iz pandemije covida-19. Predstavlja izvirno uporabo kulturnozgodovinske aktivnostne teorije, s katero želi reinterpretirati dokaze o razširjeni izgubi učenja in vse večji neenakosti v izobraževanju, ki sta posledica pandemije, ter prepoznati inovativne priložnosti za transformativno učenje s preoblikovanjem krize kot dvojne spodbude. S pregledom dokazov o nastajajočem izobraževalnem okolju najprej oblikujemo sliko novega »problemskega prostora«, po katerem morajo šole delovati. Razvijamo zemljevid problemskega prostora, ki je prva spodbuda za izražanje lokalnih izzivov. S povezovanjem tega problemskega prostora z raziskavami o profesionalnih spremembah opredelimo konceptualna orodja, da bi zajeli učne vrzeli in izvedli pedagoške ukrepe v velikem obsegu ter tako okrepili delovanje šol pri neposrednem reševanju krize. Ta orodja lahko delujejo kot druga spodbuda, ki učiteljem omogoča, da se lotijo lokalnih izzivov. Na koncu razpravljamo o izobraževalni krizi v obdobju covida-19 kot edinstveni spodbudi za profesionalno učenje ter predstavljamo možnosti za trajne premike v izobraževalnem razmišljanju in praksi po pandemiji. Trdimo, da lahko to zgodovinsko motnjo brez primere izkoristimo kot priložnost za transformativno strokovno učenje. Zlasti razmišljamo o tem, kako raziskave o profesionalnih spremembah ponujajo lokalne, razširjene intervencije in orodja, ki lahko pomagajo učiteljem preprečiti, da bi nova spoznanja po pandemiji ostala prezrta. Z uporabo pojmov meja in z orodjem posredovane profesionalne spremembe preučujemo načine, kako ta motnja ustvarja priložnosti za predvidevanje alternativnih prihodnosti za pravično učenje v šoli.

Ključne besede: covid-19, izguba učenja, kulturnozgodovinska aktivnostna teorija, implementacija, transformativno delovanje

Introduction

In spring 2020, teachers faced the unprecedented task of educating 1.4 billion students remotely worldwide due to Covid-19 (UNESCO, 2021). In the United Kingdom alone, 98% of primary and secondary students began learning from home, including many of the most vulnerable students (Department for Education (DfE), 2020a). Even short gaps in schooling can lead to lost learning (Patrinos & Donnelly, 2021), thus concern about the pandemic's adverse effects on children quickly arose. Entering 2021, over 250 million children were still affected by ongoing school closures, and many more by educational disruptions (UNESCO, 2021). The present paper addresses schools' transformative agency in responding to this educational crisis.

The widespread educational disruption has led to growing acknowledgement that returning to what was before is neither viable nor desirable for many schools post-pandemic. Teachers and schools face significant challenges, involving cumulative learning loss for most children (Azevedo et al., 2020) and problems in students' confidence and physical and mental wellbeing (DfE, 2020b), which exacerbate existing local and global educational inequalities (UNESCO et al., 2020). These challenges take place alongside teachers' elevated stress and reduced wellbeing (Aperribai et al., 2020). Reduced resources for schooling due to economic circumstances also impact teachers' capacity to address changing needs (Julius et al., 2020). It will not be feasible for most countries to address the widespread adverse effects at the individual level; a great deal of expectation will fall on schools and teachers. Rapid change within schools is needed to ensure that the pandemic's negative effects on teaching and learning are mitigated effectively. International agencies have proposed the need for policies defining a vision for education as a roadmap to improve long-term outcomes and equality (UNESCO, 2020). Although policy mandates can influence the definition and scope of this vision by setting goals, achievement expectations and their related inducements (Datnow & Park, 2009; Honig, 2006), how this vision translates into actual practice will be a highly local process (Ball et al. 2012; Niemi, 2021).

The pandemic has played out in varied ways within and between countries. While Covid-19 has exacerbated pre-existing inequalities, it has also revealed latent educational resources (OECD, 2021): whereas some high-income countries (HICs) struggled to implement remote teaching despite reasonable resources (Cullinane & Montacute, 2020; Eickelmann & Drossel, 2020), in some low-income countries (LICs) regional responses to Covid-19 were facilitated by pre-existing efforts to address educational inequalities (ASER, 2020;

Sabates, 2020). Similarly, there is significant variation *within* countries as to how schools have experienced and addressed the pandemic (e.g., Andrew et al., 2020; Ermenc & Urbančič, 2021; Huber et al., 2020; Yorke et al., 2020). Consequently, locally responsive solutions are required in addressing the pandemic's educational impact. We may hereby look to new places for learning.

The significant demands notwithstanding, evidence of teacher agency in responding to the pandemic demonstrates capacity within the system to adapt to changing circumstances (Ermenc & Urbančič, 2021; Gudmundsdottir & Hathaway, 2020; Niemi & Kousa, 2020; Ofsted, 2021). However, no system can sustain emergency circumstances indefinitely. Policies and resources are needed to continue supporting schools' efforts beyond the pandemic to capture and foster professional learning. We therefore ask: what evidence-informed approaches exist that can facilitate transformative agency in schools, helping sustain new insights and identify and address learning loss in a locally responsive manner at such scale beyond the pandemic?

In order to support such adaptations at scale, we need to understand the mechanisms by which teacher learning occurs (Opfer & Pedder, 2011). Research syntheses show that effective contextually adaptive professional learning opportunities enable teachers to gain new insights into their *own* practice (Kennedy, 2019). Beyond existing practice, to respond to Covid-19 and its aftermath, teachers literally need to learn *what is not yet there* (Engeström, 2001). The literature suggests this requires new professional learning opportunities, including time to collaborate in order to develop and share new pedagogic practice within and across schools (Darling-Hammond & Hyler, 2020). However, mere reflection on practice is not sufficient for transformative agency: to enable teachers to learn what is not yet there, they need *tools* that can enable them to see, and collaboratively work on, the emerging problem space in new ways (Rainio & Hofmann, 2015, 2021; Soini et al., 2016).

Working with the understanding of change as a tool-mediated process, we draw on cultural-historical activity theory (CHAT) and Vygotsky's notion of *double stimulation* as a conceptual mechanism of transformative agency (Sannino, 2015). In Section 2, we use emerging evidence from schooling in the pandemic to map the problem space facing teachers, anchoring evidence in our own UK context, and highlighting how the phenomenon differs in other settings. We discuss how this map can serve as a *first stimulus* for researchers and educators to identify and articulate their local problems, competing priorities and new possibilities. In Section 3, we introduce research-based conceptual tools that can act as a *second stimulus* for teachers to collaboratively capture, design and effect change at the school level. Finally, we theoretically reframe

the Covid-19 crisis as a unique stimulus for professional learning and outline the potential for durable shifts in educational thinking and practice beyond the pandemic. This paper advances our understanding of how schools can become change agents capable of reimagining local practice in order to address the challenges arising from the Covid-19 pandemic.

Reviewing the evidence: Mapping the problem space for pandemic and post-pandemic education

Theoretical and methodological framing

In CHAT, the 'object' of collective activities is often described as the *problem space* that orients the activity's efforts. In school teaching and learning, teachers work on the problem space of student learning with the help of mediational tools – curricula, pedagogic approaches, teaching materials, assessments – to achieve desired outcomes (Engeström & Sannino, 2010). Problem space does not signal this object – students' learning – as being problematic, but rather indicates that it is the activity's motivator. In this section, we explore the changing problem space facing schools by reviewing emerging evidence from the UK and beyond. We extend the evidence base of the pandemic's impact on schools by synthesising the possible dimensions in which schools in different locations may face challenges and utilise resources.

Informed by Vygotsky's notion of the double stimulation as the mechanism by which transformative agency becomes possible (Sannino, 2015), we offer our mapping exercise as the first stimulus, the initial problem situation that needs addressing. While the problems of one's professional practice influence practitioners' work, their nature is not always evident to participants, especially in the unprecedented pandemic circumstance. Synthesising and mapping key dimensions of possible impact can help educators and researchers to capture and articulate the local problem space for their practice. In order to draw a holistic picture of the challenges facing individual schools and educators, our mapping exercise examines data about learning loss, children's health, teacher agency, wellbeing and school leadership. Drawing on UK and global evidence, we illustrate geographical and institutional variation in the challenges.

The evidence base is rapidly evolving. We have monitored and included evidence published between March 2020 and June 2021 using a range of sources to identify emerging data from academic databases (ERIC, Scopus, WoS, BEI, Google Scholar), pre-prints, and reports from international and UK-based organisations. As well as reviewing key UK data, we have assessed evidence from

various European and global locations, accessing documents in multiple languages. The evidence has been prioritised using the following criteria: (1) most recent; (2) high quality; (3) offers comparison with the UK; (4) cumulative since the beginning of the pandemic.

Capturing actual impacts on learning may take years, but there are ongoing efforts to capture emergent learning losses using both objective and proxy measures (Ofsted 2020a, b, c; Sharp et al., 2020; UNESCO et al., 2020). Early findings from Australia, Europe, the UK and the US show that although not all children have experienced learning losses, many children have lost between one and five months of learning (Education Endowment Foundation (EEF), 2020; Patrinos & Donnelly, 2021), while simulations project up to one year or more of learning loss in some LICs (Angrist et al., 2021). Differences have emerged across subject areas and age groups, while socioeconomically disadvantaged and racially marginalised learners have often experienced greater losses (EEF, 2020; Patrinos & Donnelly, 2021). Measuring actual learning losses systematically is proving challenging due to a lack of assessment standardisation (Middleton, 2020), a lack of system-wide approaches (UNESCO et al., 2020) and inaccurate/incomplete results due to missing assessment data, low response rates and sampling biases (Crenna-Jennings et al., 2021; Wyse et al, 2020). Many schools are using local measures to identify and address learning losses, but there are large differences in the extent to which teachers are tracking student learning in line with existing inequalities (Hofmann et al., 2020; Ofsted, 2020b; UNESCO et al., 2020), while a lack of appropriate and comprehensive local assessment instruments poses further barriers (Ofsted, 2020b). Current assessment instruments commonly focus on core subjects such as literacy and numeracy (Ofsted, 2020b), but real-time evidence suggests learning losses may be far wider (Ofsted, 2020a, b). With an emergent and incomplete picture of Covid-19's educational impact (Harris & Jones, 2020), schools must engage in rapid real-time decision making with very imperfect data. This sketch of the nature of the evidence base illuminates the challenge for schools and provides a context for interpreting our findings.

Learning loss

Four main mechanisms appear to be shaping learning loss: *how much* time children spend on learning; *what* curriculum content they cover; *how* they are learning, and individual and systemic *readiness* for remote and disrupted learning (OECD, n.d.; Vuorikari et al., 2020). Children have spent substantial but varied amounts of time out of school due to closures, absences and

drop-outs (Sibieta & Robinson, 2020; UNESCO et al., 2020) and typically spend less time on educational activities in remote learning than in schooling-as-usual (Andrew et al., 2020; Gustafsson & Nuga, 2020). Moreover, learning time is unequally distributed in line with existing inequalities (Alban Conto et al., 2020; Bayrakdar & Guveli, 2020; Eivers et al., 2020; Green, 2020). UK children from poorer households are estimated to have spent 7–15 fewer days learning between March and September 2020 than their better-off peers (Andrew et al., 2020). In Ethiopia (over nine-months of school closures), teachers often provided welfare support rather than educational activities, while urban students received more teacher support than rural students (Yorke et al., 2020). Ethnicity-related disparities in the extent and nature of access to remote learning are also reported, such as amongst Roma learners (Bešter & Pirc, 2020). Finally, reduced curriculum coverage has been reported at institutional and system levels, especially early in the pandemic (Alam & Tiwari, 2020; Ofqual, 2020; Ofsted, 2021), but the nature, extent and impact of this is not yet known.

Remote and digital learning have been used to mitigate learning loss, yet limitations in infrastructure, home-based support (Sabates et al., 2021), and intended and actualised provision limit learning and exacerbate inequities even in HICs. Whereas 75% or more of children in Italy, Norway, Portugal and Romania reported having daily online interactions with their teachers during the spring 2020 lockdown, this was true of only 50–75% in France, Ireland, Spain and Switzerland, and 34–41% in Germany, Austria and Slovenia (Vuorikari et al., 2020). In the UK, over half of private-school students took part in daily digital lessons in Lockdown 1, compared to only 30% of middle-class and 16% of working-class students from state-funded schools (Cullinane & Montacute, 2020). Although UK provision of digital live lessons has increased dramatically since the first lockdown, disparities between richer and poorer households' access have increased (Montacute & Cullinane, 2021). A similar divide exists globally. Ninety-five percent of HICs use online platforms as the main source of remote learning, compared to only 63% of LICs, with greater use of radio and television (UNESCO et al., 2020). The often necessary shift from two-way, dialogic classrooms to asynchronous, monologic modes of (remote) delivery such as workbooks, video, television/radio and SMS (Andrew et al., 2020; Montacute & Cullinane, 2021) has created concomitant challenges to maintaining high-quality communication, assessment and feedback (Alam & Tiwari, 2020; Lucas et al., 2020; Ofsted, 2021). The picture is more complex in fully or partially open schools; inquiry-based, collaborative and hands-on pedagogic strategies are reported as casualties of public health restrictions in the UK (Ofsted, 2020c; Sharp et al., 2020). In LICs, however, smaller class sizes associated with

partial openings provide more opportunities for classroom dialogue and targeted support (McAleavy, 2020). This illustrates the context-specific nature of actualised learning loss and the mechanisms contributing to it.

Children's wellbeing and learning conditions

Despite evidence that health and wellbeing are independently associated with educational attainment (e.g., Faught et al., 2019), discussions in the UK have largely framed these as peripheral educational concerns in the pandemic. UK reports highlight disparities in the impact of the pandemic on health and wellbeing across subgroups of the school population (e.g., ImpactEd). Insufficient study space, equipment and social support in the home has decreased the productivity of remote learning in less well-resourced families and ethnic minorities, as well as for children with special education needs (Andrew et al., 2020; Radhakrishnan et al., 2021; Scottish Government, 2020). Children from lower socioeconomic status (SES) groups are most reliant on their school for regular meals, physical activity opportunities and social support, and hence have been most adversely affected (e.g., Andrew et al., 2020; Rundle et al., 2020; Scottish Government, 2020). For children with special education needs, the absence of support structures and resources has impeded learning (DfE, 2020b; Disabled Children's Partnership, 2021; Scottish Government, 2020). Preliminary large-scale evidence suggests that children with pre-existing health conditions, children from lower SES groups, and children who have been infected with Covid-19 have experienced increased levels of anxiety, depression and post-traumatic symptoms (de Miranda et al., 2020). As reported by a global review (Loades et al., 2020), prolonged social isolation increases the risk of mental health difficulties in previously healthy children, as well. A European survey reported that parental stress from unsupported homeschooling, often alongside work, adversely impacts children's wellbeing, especially where children are exposed to unhealthy parental behaviours including conflicts and drug and alcohol use (Thorell et al., 2020). The wellbeing of many children has further suffered from increased domestic stress factors, such as financial pressure and unemployment, bereavement and domestic abuse (DfE, 2020b; Scottish Government, 2020). Pre-pandemic research highlighted the fact that parental mental health influences children's education (Loch, 2016), and this extends to more families post-pandemic. Alongside wellbeing, emerging research finds that school closures and societal lockdowns have affected children's physical health. High quality data from Slovenia, for example, indicate a ten year loss of physical health gains after only two months of school closures (Jurak et al.,

2021). While more research is needed to determine the medium and long-term effects of the pandemic on health behaviours (e.g., Viner et al., 2021), existing evidence demonstrates that addressing the effects of school closures on child health and wellbeing is central to post-pandemic educational recovery.

Teachers and school leadership

The literature reports significant teacher agency and resilience in responding to the crisis, with teachers adapting quickly despite often limited prior experience with remote teaching (Gudmundsdottir & Hathaway, 2020; McLeod & Dulsky, 2021; Niemi & Kousa, 2020). Some teachers report that the circumstances have enabled a better understanding of their students (Moss et al., 2020) and generated new practices worth retaining upon the return to in-person teaching (Breeze, 2020). However, concerns exist about teachers' mental health and professional wellbeing due to increased and unpredictable workload (Aperribai et al., 2020). In England, Kim et al. (2021) identify that teachers faced with partial school reopening experienced feelings of uncertainty, practical concerns and worry for students. While further research is needed, the potential intensity and scale of the challenge to teachers and their wellbeing is significant.

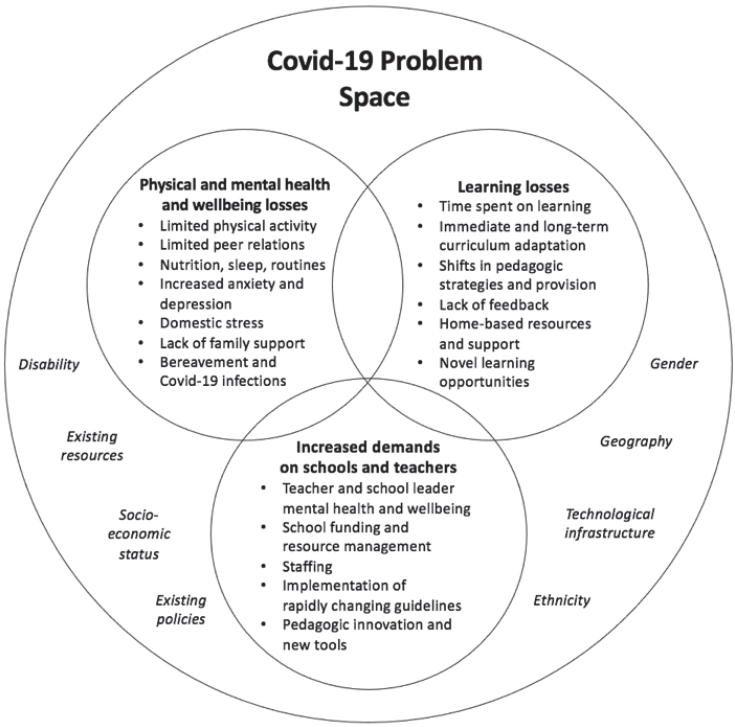
Many school leaders are exhausted due to prolonged operation in crisis leadership mode (Harris & Jones, 2020; Kelly, 2020; Thornton, 2021). Leaders report having to rapidly navigate confusing government guidelines (Beauchamp et al., 2021). They engaged in adaptive strategies, such as bridging tactics that included support-building with school networks and external agencies, brokering tactics for negotiating shared understandings and agreements with cross-boundary professional communities, and buffering tactics to mediate external pressure and filter information to school staff and community (Hulme el al., 2021). These tensions were complicated by often conflicting stakeholder responses to Covid-19 (Netolicky, 2020). The early evidence highlights the importance of support for school leaders (Harris & Jones, 2020).

Schools face new challenges regarding the range and availability of resources to manage daily work, such as increasing use of online platforms and hardware, ensuring operational Covid-19 safety (Sharp et al., 2020), and recruiting staff to support students' new educational needs (Mental Health Foundation Scotland, 2020a). Evidence from UK school leaders shows that communications have expanded to allow informal support among teachers and families (Beauchamp et al., 2021). Teacher absences have exacerbated these challenges. In some contexts, teacher retention is an increasing issue (Darling-Hammond &

Hayler, 2020), although in the UK, retention and applications for initial teacher training have increased due to perceived job security (Worth & McLean, 2020). Nonetheless, new challenges arise from organising new teachers' mentoring and training placement provision (Harju & Niemi, 2016; Worth & McLean, 2020). These add to Covid-19-related additional expenditure, which, alongside lost self-generated income (e.g., breakfast clubs and facility rental), is estimated to exceed 5% of UK school income (Julius et al., 2020).

Figure 1

Problem Space for Schools: Capturing, Evaluating and Acting on Local Data from Emergent Challenges



Our review illustrates the three interlocking components shaping the new problem space for education: student learning losses; student physical and mental health and wellbeing losses; and increased demands on schools and teachers. It also illustrates that researchers and educators must attend to the *underlying mechanisms* that shape these components and how local circumstances and schools' starting points, in intersection with existing educational

inequalities, lead to different manifestations of these mechanisms and therefore require locally specific solutions.

Figure 1 visualises this new problem space from the perspective of a school or local setting, with the challenges and opportunities for schools situated at the centre and within existing educational inequalities and the local context. It is intended both to summarise our findings and to serve as an initial tool for practitioners to capture the nature of local problems and opportunities, thus helping to articulate the first stimulus in learning through and from Covid-19.

In interpreting the evidence of the new problem space for schools, our review also suggests where the pandemic's deeper learning potential for educators may lie. Delivering education and supporting students through the pandemic, teachers and school leaders have seen traditional boundaries of schooling (school/home; school/welfare agencies; teacher/leader) made visible and/or blurred. Working at, and crossing, boundaries is challenging (Edwards, 2012), but research suggests it makes multiple diverse tools available (Gutiérrez et al., 1999); engaging with the otherness present in/at a boundary is also itself a distinct stimulus for dialogic learning (Akkerman & Bakker, 2011; Niemi, 2021).

Conceptual tools from research on professional learning and change

Transformative agency through double stimulation

In generating potential tensions between pre-existing desired educational outcomes and the problem space facing schools post-pandemic, and in blurring the boundaries of schooling-as-usual, the pandemic opens new learning opportunities that drive the possibility of change. In Section 3, we integrate the as-defined problem space with our research on tool-mediated professional change. While research demonstrates the potential benefits of research-informed practice development by teachers, it also shows that teachers often face practical difficulties in making use of research-based ideas (Ion et al., 2021). This will be particularly true in the pandemic/post-pandemic circumstances we have outlined in Section 2. Our research extends our understanding of, and capacity to address, this problem by specifically drawing on concepts and instruments developed and evaluated from the perspective of their capacity to support teacher-led local change.

CHAT suggests practitioners and institutions working on these boundaries can achieve transformative agency to address problems through the mechanism of double stimulation and the use and creation of locally relevant tools

(Engeström & Sannino, 2010). CHAT understands tools as instruments capable of doing epistemic work in a professional community/practice. While primary tools (protocols, reports) and secondary tools (thinking tools, models) describe the 'what' and 'how' of educational practice, 'where to' tools are new concepts capturing an institution's direction, helping reimagine new possibilities. The second stimulus refers to the mediating conceptual tools, which actors can adapt to analyse and work on their practice problems, the first stimulus. While, in CHAT, double stimulation is commonly evoked via intensive longitudinal researcher-supported developmental interventions, we seek to develop ways of facilitating transformative agency at scale necessitated by the pandemic.

Drawing on a wide body of research in the UK and elsewhere, we discuss research-based primary and secondary tools that can be taken up by schools as stimuli for addressing Covid-19-induced challenges to exemplify ways of adapting existing research to support scalable school-led transformative agency.

Capturing student learning to inform local teaching

During and post-pandemic, teachers and researchers need to identify and communicate local learning challenges in ways that inform teaching and local decision-making (Hofmann et al., 2021b). Our research shows that even when teachers know what their students need and can judge whether students' learning, confidence or wellbeing is improving, they find it challenging to *capture* those improvements as evidence (Hofmann et al., 2020). While existing standardised learning assessments can identify some learning losses, these have shortcomings. Especially when linked to high-stakes testing, such assessments can have unintended consequences, generating demotivation and anxiety, particularly for the most disadvantaged students (Barret, 2016). This raises concerns given the pandemic's mental health impact. As broad comparative policy tools, such assessments often do not disaggregate results sufficiently to provide nuanced understandings of students' learning for teachers (Azevedo et al., 2020). Crucially, they are commonly not designed to inform *teaching*. Moreover, as discussed, the pandemic has also impacted children's confidence, wellbeing and social opportunities. Teachers lack tools to assess these aspects of learning (Hofmann et al., 2020).

Schools need light-touch, easy-to-administer assessments addressing a broad range of knowledge/skills that are easy to interpret locally and helpful for teachers in informing teaching, such as those used in many LICs (https://palnetwork.org/tools/). These assessments should address literacy and numeracy, non-cognitive aspects of learning and other learning conditions and goals, including sufficient disaggregation. In the *epiSTEMe*-project, we developed

and tested instruments to measure student learning, attitudes and confidence in science and mathematics collaboratively with UK secondary teachers (Howe et al., 2015; Ruthven et al., 2017). These instruments have been built into an openly available self-evaluation tool for teachers (Hofmann & Ilie, 2019). In the *TEACh*-project, alongside literacy and numeracy assessments, we adapted instruments from Young Lives (Iyer et al., 2017) to assess children's academic self-esteem and peer relations. These instruments were developed collaboratively with research partners in India and Pakistan, and used with a large number of children in both school and home learning settings. They were designed to be informative to teachers themselves and are also available for schools (https://www.educ.cam.ac.uk/centres/real/researchthemes/teachingandlearning/effectiveteaching/; Young Lives, n.d., a; b). We are currently conducting new research into scalable professional development interventions that can help schools assess and counteract children's sedentary lifestyles during the pandemic and capture improvements (Ryan et al., 2020).

Facilitating teacher noticing regarding students' unexpected learning gaps and gains

Children may have gained knowledge and life skills in the pandemic that they otherwise would have not have (Sabates, 2020). However, these may not be easy for teachers to identify. Our research shows that teachers often systematically miss opportunities to notice their students' unexpected knowledge and learning capabilities, especially in low-SES settings (Hennessy et al., 2016; Rainio & Hofmann, 2021). Moreover, teachers' collective conceptualisations of students influence teacher noticing, often limiting their perceptions of student capabilities (Rainio & Hofmann, 2015, 2021). This can work both ways: teachers miss learning gaps in high-attaining students and overlook existing knowledge/skill in low-attaining students (Tiong, 2021). While opportunities to discuss their assessments of students with colleagues are central, these do not automatically lead to teacher learning and noticing: unexpected learning patterns are often explained away or not addressed in collaborative planning discussions. This can be helpful insofar as it serves the purpose of making work manageable through reducing complexity and facilitating quick solutions under time pressure. However, these assumptions have been shown to be consequential for students' classroom learning, leading to missed opportunities to support learning (Horn & Kane, 2015; Wilhelm et al., 2017).

Teachers need tools to notice and systematically explore unexpected observations. Our own research, as well as that of others, suggests the importance

of stimulating teachers to share concrete representations of practice with colleagues, combined with the explicit conceptual ideas of slowing down and 'staying with' surprising or puzzling data and purposefully avoiding premature explanations and closure or rushing to solutions (Horn & Kane, 2015; Rainio & Hofmann, 2021). Such opportunities can be facilitated at scale by trialling new classroom interventions, which we have shown nearly always leads to surprise about what students know and can do (Hofmann, 2020a). This finding, observed by our teacher collaborators themselves, has been replicated across countries from the UK to Scandinavia and Africa in research on school interventions. The pandemic has necessitated the trialling of new ways of teaching. Schools should ensure they capitalise on the transformative professional learning potential this offers. Opportunities to stay with such new surprising insights can be supported by fit-for-purpose assessment tools, structured peer facilitation (Hassler et al., 2018) and organisational routines that create regular spaces for self-reflection, working out changes in practice and stabilising those changes over time (Sherer & Spillane, 2011). In order to effectively facilitate generative dialogues and stabilisation of new practices, however, such organisational routines need to be enriched through collaboration and trialling tools (Dickens, 2021; Hassler et al., 2020; Marfan, 2021; Rainio & Hofmann, 2021). We next discuss some examples.

Implementing classroom interventions

Research shows that teachers often locate themselves as unagentic vis-à-vis change (Horn & Kane, 2015; Rainio & Hofmann, 2015, 2021). This deters change efforts and decreases teacher wellbeing (Soini et al., 2016). Having to trial new interventions in the workplace as part of professional development courses leads to greater awareness of one's agency to effect change (Rainio & Hofmann, 2021). Herein lies the *paradox of agency* of professional change (Hofmann, 2020b). In order to enable unsupported trialling at scale, we developed a *starting small* approach for teachers to try out dialogic pedagogy (a well-evidenced approach supporting student learning, which teachers often find challenging, cf., Ruthven et al., 2017). Our approach was developed in collaboration with UK primary and secondary teachers and involves a tool teachers can use without researcher support to capture new insights from a single-lesson trial (Hofmann & Ilie, 2019, 2021). Our proof-of-concept study has demonstrated its potential for new insights (Hofmann & Ilie, 2021), and we are currently conducting research about the initial conditions and mechanisms of getting new pedagogic interventions off the ground at scale.

Our research has further demonstrated the often hidden role classroom norms play in shaping educational practice (Hofmann & Ruthven, 2018), revealing the multi-dimensional nature of interaction norms that guide classroom practice. Surface level norms, such as 'listening to others', can be enunciated in terms of multiple underlying rationales and, unless explicitly addressed, can lead to the superficial adoption of new interventions. Adapting this research, we have developed a tool for dialogic teaching interventions, the *People, Talk, Ideas* tool (Hofmann & Ilie, 2019), which supports in-depth classroom discussions. In addition, it can help teachers develop tools to address implicit normative aspects of teaching and learning that hinder change. The tool has been trialled and productively used by numerous UK and other European primary and secondary teachers across multiple projects supporting change efforts (Hofmann et al., 2021a).

Finally, a leadership and collaboration tool we developed, the *Who, What, Why and When* tool (Hofmann & Vermunt, 2020; Hofmann, 2020b), can help practitioners identify and map out expected and unexpected 'others' who can support their change efforts in different ways. In highlighting latent knowledge and support available within organisations, this tool facilitates *relational agency*, professionals' capability of working productively with others to support change (Edwards, 2012).

A number of these tools have been integrated into an implementation model (Hofmann, 2020a) that has been trialled collaboratively with UK schools and operationalised into the *ED:TALK Dialogue and Evidence Toolkit* (Hofmann & Ilie, 2019, 2021), which has been developed to support teachers and schools in developing research-informed teaching and learning. The Toolkit is designed to offer an off-the-shelf tool to support school-led efforts for pedagogic innovation adaptable to existing curricula and local learning needs. It offers teachers the means to design, plan and evaluate teaching improvement projects of their choice, including support for teacher noticing and collaboration.

While many of the tools discussed here are concrete objects, assessments and thinking tools that teachers can download and readily use, they can also support schools' own second stimulus tool generation. Taken as a starting point, these tools can be adapted by teachers for their own local setting via collaboration and dialogue. They need to be filled with concrete local detail (and accountability) and the test of their effectiveness is in their use in each local setting. In the process, the original tools can be transformed and shared with others. Ultimately, these tools and others like them can help participants develop new 'where to' tools (cf. Engeström, 2001), actionable concepts to reimagine their goals for teaching and learning and the ways of achieving these goals.

Discussion and conclusion

The Covid-19 pandemic has created an unprecedented global educational crisis disrupting the lives and learning of millions of children worldwide and has pushed teachers and schools beyond the boundaries of practice-as-usual. The present paper advances our understanding of scalable, evidence-informed approaches and tools to facilitate sustained transformative agency in schools to address learning losses and opportunities emerging from the pandemic. It does so by conceptualising transformative agency through cultural-historical activity theory, as achieved through the mechanism of double stimulation and combining it with a body of research on scalable change tools for schools. Emerging data points to agentic emergency responses by schools and teachers, but also highlights perceived difficulties in addressing the pandemic's impact. The literature suggests that we now need new learning and collaboration opportunities for teachers to develop possibility perspectives and to capture, develop and sustain what is most promising from these novel pedagogic responses; it also acknowledges gaps in our understanding of the mechanisms of facilitating such transformative learning at scale (Darling-Hammond & Hyler, 2020; Hofmann, 2020a; Kennedy, 2019). While sustaining schools' agency requires support through innovative policies and associated financial, political and multi-professional resources, we also need research-informed approaches and tools that can support schools in using these resources locally to generate and disseminate change (cf. Niemi, 2021).

The present paper has mapped the first stimulus problem space facing teachers and schools, contributing to the identification of the possible range of factors influencing local learning loss, highlighting the under-researched role of the pandemic's impact on children's health and wellbeing in forming learning conditions, and depicting how the blurring of school boundaries has impacted teachers' work. It extends the existing evidence-base from the pandemic by advancing understandings of the underlying factors influencing and mediating surface-level manifestations of problems, which will affect pandemic responses and future research.

Secondly, we have identified adaptable research-based tools to enable locally responsive school-based educational innovation in response to the pandemic. We have illustrated tools to identify unexpected learning gaps and gains, to facilitate teacher noticing and collaboration, and to support the implementation of pedagogic innovations. Besides being a direct contribution to teacher learning, these tools, as second stimuli, can contribute to facilitating transformative agency at scale, while also providing new conceptual tools for future research on enabling pedagogic change. Our research advances our

understanding of scalable applications of CHAT (cf. Edwards, 2008) as a novel way of enabling educational change post-pandemic.

Our research also advances our understandings of the mechanisms of teacher learning (cf. Opfer & Pedder, 2011) during a pandemic more broadly, and suggests ways of capturing these mechanisms. The pandemic has necessitated the development and trialling of entirely new ways of teaching, generating a unique professional learning opportunity. We have discussed how trialling new approaches and working on new boundaries enables novel insights into practice, which is a key mechanism of sustainable teacher learning. Our second stimulus tools not only enable pedagogic innovation and accountability, but also help teachers and schools materialise new insights in new practices, in order to avoid these new learnings from 'slipping away' post-pandemic. Collaboratively examining such new insights can contribute to expanding teachers' horizon of possibility (Engeström, 2001; Rainio & Hofmann, 2021). Together with the tools we have described, the new pandemic insights can prompt new sense-making regarding novel directions for teaching and learning in school. In this way, our research contributes to schools' possibility of collectively reimagining local practice to address the challenges arising from the Covid-19 pandemic. By enabling teachers to capture and communicate their learning of what matters, our research also contributes to the need to share schools' learning across institutions and contexts (Darling-Hammond & Hyler, 2020; Hofmann et al., 2020; Niemi, 2021).

Our work invites future research on:

- Mechanisms facilitating schools' take-up and implementation of research-based pedagogic tools and the stabilisation of such tools into sustainable new practices at scale; their impact on teacher professional agency and student learning;
- School-based scalable interventions to support children's learning conditions, including health and wellbeing post-pandemic;
- Mechanisms of school-led teacher learning from boundary-crossing professional dialogues.

The present paper offers a foundation for such work and a way of integrating these strands of theorising educational responses to the pandemic.

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The Challenge to Educational Reforms during a Global Emergency: The Case of Progressive Science Education

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This article argues that what is most at risk in schooling during a global pandemic, or other similar broad challenges to normal functioning, are those elements that might be considered the less traditional and so the most progressive. After setting out some general background common to the challenge faced by schools and school teachers, this argument is exemplified through the case of school science education. Two particular aspects are considered: one related to pedagogy (responding to learners' alternative conceptions or 'misconceptions') and one related to curriculum (teaching about the nature of science). These are considered 'progressive' features in the sense that they have widely been championed as ways of improving and reforming science education across a wide range of national contexts but can be understood to have faced resistance both in the sense of being opposed by 'reactionary' stakeholders and in terms of the level of support for teacher adoption. It is argued that at a time when the education system is placed under extreme stress, such progressive elements are at particular risk as teachers and administrators may view them as 'extras' rather than 'core' features of practice and/or as reflecting more 'difficult' educational objectives that may need to be de-prioritised (and so neglected) for the time being. In that sense, they are fragile aspects of practice that lack the resilience of more established, and thus robust, features. It is concluded that where progressive elements are especially valued, they need to become sufficiently embedded in custom and practice to no longer be viewed as luxuries but rather to be recognised as core elements of good teaching to be protected and maintained during a period of emergency.

Keywords: constructivism, dialogic teaching, online learning, progressive science education, reform resilience, teaching nature of science

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Izziv za izobraževalne reforme med globalno krizo: primer progresivnega oz. naprednega naravoslovnega izobraževanja

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V članku trdimo, da so v šolstvu med globalno pandemijo ali drugimi podobnimi obsežnimi izzivi za normalno delovanje najbolj ogroženi tisti elementi, ki bi lahko veljali za manj tradicionalne in zato najnaprednejše. Po predstavljenih splošnih značilnostih, ki so skupne izzivom, s katerimi se spoprijemajo šole in učitelji, je ta trditev ponazorjena s primerom šolskega naravoslovnega izobraževanja. Obravnavana sta dva posebna vidika: prvi je povezan s pedagogiko (odzivanje na alternativne predstave učencev ali njihove »napačne predstave«), drugi pa z učnim načrtom (poučevanje lastnosti naravoslovja). Ti vidiki veljajo za »napredne« v smislu, da so jih v številnih nacionalnih okoljih na splošno zagovarjali kot način za izboljšanje in reformiranje naravoslovnega izobraževanja, vendar je mogoče razumeti, da so naleteli na odpor v smislu nasprotovanja »reakcionarnih« deležnikov in v smislu ravni podpore, ki bi jo sprejeli učitelji. Trdimo, da so v času, ko je izobraževalni sistem pod skrajnim pritiskom, takšni napredni elementi še posebej ogroženi, saj jih lahko učitelji in administratorji obravnavajo kot »dodatke« in ne kot »temeljne« značilnosti prakse in/ali kot odraz »zahtevnejših« izobraževalnih ciljev, ki jih je mogoče treba za zdaj umakniti s prednostnega seznama (in tako zanemariti). V tem smislu gre za krhke vidike prakse, ki niso tako odporne kot bolj uveljavljene in s tem trdnejše značilnosti. Sklenemo lahko, da se morajo progresivni elementi, kadar so še posebej cenjeni, dovolj vgraditi v običaje in prakso, da jih ne bi več obravnavali kot razkošne, ampak bi jih priznali kot temeljne elemente dobrega poučevanja, ki jih je treba zaščititi in ohraniti v obdobju izrednih razmer.

Ključne besede: konstruktivizem, dialoško poučevanje, spletno učenje, progresivno oz. napredno naravoslovno izobraževanje, odpornost na reforme, poučevanje lastnosti naravoslovja

Introduction

The Covid-19 context

The year 2020 was 'out of the ordinary'. The new coronavirus identified in China in 2019, Covid-19, quickly became a global issue early in 2020: a global pandemic. Societies that considered themselves advanced technologically, economically, even ideologically, found that 'business as normal' was interrupted. Health services faced being overwhelmed. In various parts of the world, many people were asked, told, or indeed ordered to stay at home and only to leave the house for essential activities, for periods of weeks or even months. Often the guidelines, rules or regulations were changed frequently and at short notice as authorities came to terms with the nature of the illness, potentially effective treatments, and the rate and mode of transmission of the virus (and its variants), and sought to balance the warnings from epidemiologists against considerations of (1) the (economic, social, and well-being) costs of disrupting normal economic and social activity; (2) the undesirability of impinging upon the usual rights of individual citizens (e.g., free movement, freedom of association); and, indeed, (3) the need to lever public co-operation with the restrictions being imposed.

Education systems were, at times, faced with high absentee rates due to illness, self-isolation of those thought to have been exposed to infection, shielding of those most at risk, and individual decisions to keep students at home. Then, there were periods with partial or complete closure of school and college buildings. Teachers might be expected to both work directly with the children of those considered to be doing essential work who needed to be kept economically active, as well as provide education for the majority being asked to stay at home. In principle, at least, in many contexts, education moved 'online' for extended periods. Teachers would teach, and students would learn via the Internet.

That simple description belies myriad complications. Two obvious ones are connectivity and hardware. Effective distance learning through the Internet requires a reliable connection with sufficient bandwidth. It also requires enabled devices: a computer of some kind with the requisite applications. In some communities, in some parts of certain countries, these might largely be taken for granted. Nevertheless, access is an equity issue when some learners do not have broadband connections or regular access to a connected device, or a safe, comfortable and quiet space to go online. In other parts of the world, good connectivity and personal access to a suitable computer may be the exception or even lacking across a whole community.

Teaching relies on a social contract between teacher and learners

Even in an ideal context, in which a teacher and all her class are well connected, there are significant challenges to school teaching, both in primary (elementary) and secondary (high school) contexts. As most people today are encultured into societies with school systems, it is easy to overlook how schooling is far from a natural system of education. Specifically, humans evolved to be capable learners within certain social contexts - usually small groups whose members have graduated and progressing levels of expertise (Lave & Wenger, 1991). We still find something like this in the postgraduate education of scientists (Kuhn, 1970). The novice joins a specialist laboratory or research group as a new research student alongside other group members who are already further in their programme of study (established research students, post-docs who have graduated beyond that stage; and university lecturers and professors with considerable experience and expertise).

Such a context allows prolonged engagement with specific areas of learning, a high level of commitment to, and ownership of, a personal project, individualised learning paced for the particular learner, and opportunities to learn specific skills, techniques or ideas on a 'just-in-time' basis. By contrast, school (and much undergraduate) education is based on a model of one expert teaching many novices in short blocks of scheduled time. Of course, this is more efficient for mass education in logistic and economic terms (and the usually tacit child-minding function of schooling has become explicit in public discourse during the pandemic), but means that students are often not learning something they are especially interested in, and to a large degree all those in a specific class have to progress through the curriculum together despite individual differences. In many ways, the successes of teachers in so often managing, motivating, and supporting student learning in school classrooms and lectures halls should be seen as an incredible achievement - relying on the strong interpersonal skills of teachers as much as their knowledge of the curriculum. The ability of a teacher to engage a diverse group of learners in a topic in which most have little *intrinsic* interest (as is often the case in school teaching) is something that can too easily be taken for granted - but, as new teachers often discover, is far from automatic.

What keeps students in the classroom, and hopefully paying attention, is certainly *sometimes* intrinsic interest in lessons, and may *sometimes*, in part, be a threat of some form of formal chastisement, but, often, is largely a kind of social contract between student and teacher. Teachers who are judged to be respectful to, and interested in, their students, and seem to care about them as individual people, and who clearly make an effort to give interesting and informed lessons, are *usually* rewarded with the *default* of *most* students not being disruptive, and,

further, acquiescing in reasonable requests to undertake specific activities and to moderate the natural human tendency to chatter at will.

Once the 'social contract' of the classroom is negotiated (whether explicitly or tacitly) and once a good working relationship is established, both 'sides' will earn some credit to be forgiven some occasional lapses without this being seen as a threat to the established norms. A student will be forgiven the uncharacteristic slip – a misjudged joke, a yawn, a few minutes daydreaming – just as the students in a class will understand and forgive the usually fair, reasonable, and conscientious teacher who is very occasionally ill-tempered or does not seem to have prepared well for a particular lesson, or who tries something new that does not seem to be working. A teacher who, obviously, usually makes an effort to engage students in sequences of interactive activities can occasionally – on account perhaps, for example, of a headache or sore throat – persuade students to spend a lesson in quiet reading and note-taking that would otherwise be objected to as 'boring'. There is an (at least implicit) agreement: 'We may not get as much learning done today as usual, but we will have an orderly and peaceful classroom where I will tolerate some quiet chatter, and you will at least engage to some extent with the task I have set'.

Students do not generally put down their work and walk out of the classroom mid-lesson, or ignore the set task and engage in some unrelated activity for extended periods, even when they might be tempted, as this would be an *overt* contravention of the social contract and the teacher-student relationship on which it is founded. This restraint is, however, in part maintained by the nature of the setting. The teacher can normally see the whole class. Moreover, when the teacher is busily engaged with an individual or group of students, the classroom has something of the nature of the panopticon (Foucault, 1991/1977) in that the activity of the students is visible to their peers, and students will often join in the processes of monitoring and regulating the classroom (e.g., through announcements along the lines of 'Miss, Jenny is looking at her phone' or 'Sir, Tommy has put his books away, and there's still ten minutes left').

Changing the mode of teaching

Working 'online' is a very different proposition. When students are highly motivated to learn and make the best of the activity, for example, adult students who have enrolled themselves on professional development courses or postgraduate programmes, the teacher does not need to be so concerned about maintaining engagement. However, in a school teaching context, it is not as easy to monitor a class of 30 adolescents, each working on a device at distance, as it is when they are in the room with the teacher when eye contact

can be made with any student in a moment. It is not so easy to notice someone who has absented themselves from the lesson or to see what the face apparently looking into the webcam is paying attention to on the screen. A child who leaves the computer and exits the room may do so *covertly*, without obviously breaking the usual contract. Leaving all microphones on at once is a recipe for noisy distractions - but muting microphones negates spontaneity of the usual classroom dialogue and a key mode for monitoring student activity.

Moreover, teaching online is unlikely to mean just doing the same lesson via computer. Many activities do not unproblematically transfer to home-based learning. Practical work in the sciences is an obvious case. Artefacts and models that may usually be manipulated cannot be engaged with as directly. In addition, key resources usually available in the classroom may not be available online.

That said, there are likely relevant alternative resources online that could be accessed. After all, the Internet gives access to the World Wide Web, offering a virtually unlimited range of resources. For most courses, it would be possible to find excellent, suitable resources online. When planning an online course, the identification and evaluation of resources would be a key task. However, that is not possible when suddenly being told that a course normally held in school or college is *now* to be interrupted and continued virtually. The sheer volume of Internet-accessible resources is matched by a diverse range in quality, and indeed a considerable level of misinformation. The curation of reliable, curriculum-matched, and correctly pitched resources is a critical task in planning teaching. Regardless, then, of any question of whether some material can, *in principle*, be taught online as well as in person; there is the issue of the time commitment for *advanced* planning of a coherent, well organised, and well-resourced course (Taber, 2018a): something that clearly can not happen when schools are summarily closed, and the mode of teaching switches, with virtually no warning, overnight. This challenge of switching modes for whole classes is exacerbated when working with classes split between those attending the school (and probably reorganised into novel collectives) and their classmates requiring teaching at distance.

Teachers develop expertise through specific teaching experiences

Teaching is honed over time. A strong understanding of subject matter is clearly important for effective teaching - as is a good appreciation of general principles of pedagogy and knowledge of the specific curriculum requirements set out as target learning for a particular course. Teachers not only need the pedagogic content knowledge (PCK) relating to common learning difficulties and teaching approaches in a topic (Kind, 2009) but arguably also develop a

specialised form of their own subject knowledge through experience of teaching it to learners at a particular level.

So, for example, we might consider that academic chemists who research different areas (e.g., synthetic routes of natural products, as opposed to light-catalysed reactions or electrochemistry) each develop a particular form of subject knowledge which, although it may encompass the whole discipline, has particular depth, detail, nuance, and density of associations, focused on the area of specialist study. By comparison, the school chemistry teacher may seem a generalist but *also develops specialised subject knowledge* that is especially rich *in relation to* how the subject matter is processed in preparing and carrying out teaching. In relating subject knowledge to PCK (e.g., common misconceptions, useful metaphors and analogies, suitable simplified teaching models), the teacher also develops a particularly rich subject knowledge that is, in its own way, a form of specialism (Taber, 2020).

Knowing the subject and knowing how to teach are starting points but do not automatically lead to effective teaching. The teacher receives feedback through the practice of teaching: refining ideas about what works well, why a supposedly sensible sequence needs to be modified, how much longer a particular activity needs with a certain type of class, what level of understanding is reasonable to expect after first introducing a new concept, etcetera. Substantially changing the way in which teaching takes place acts as a kind of reset.

Just as when a new curriculum is introduced, or an innovative teaching approach adopted, a shift to a new mode of teaching changes the process: perhaps, a concept that had previously been readily explained suddenly becomes more opaque to learners, perhaps an activity that normally takes 20 minutes now only needs 15, perhaps paired or small group activity that usually works well at some point would be better substituted by something different. However, these are *empirical questions* that can only be addressed and indeed may only arise as teaching proceeds. Unfortunately, this is often ignored in experimental studies of teaching innovations. Instead, it is common to see well-established practice used as a comparison condition against some novel pedagogy, curriculum, or teaching resource that study participants are using in their teaching for the first time (Taber, 2019).

The global pandemic of 2020-21, then, meant that teachers not only shared in the common complications of the pandemic (risks to health, restrictions on travel and socialising, worries about at-risk relatives and friends) but also faced specific additional challenges in their professional work: including sudden shifts to less familiar modes of working, and the need to reorganise their lessons and courses without the time for advanced planning that is normally expected when

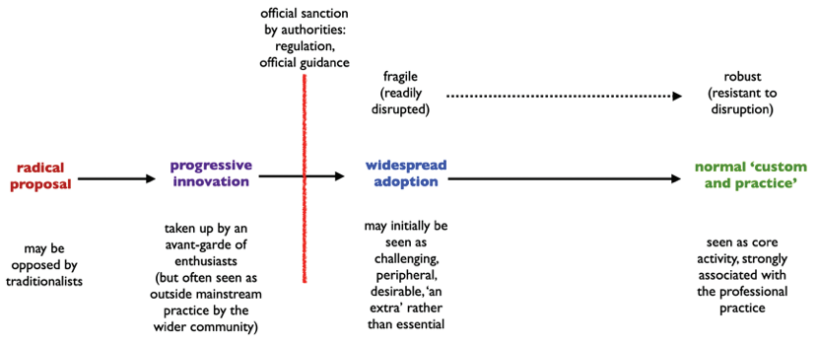
making any substantive change to professional practice. In some cases, teachers may have been expected to simultaneously continue with planned teaching to reduced classes whilst also trying to offer the same curriculum to other students now working away from school. Thus, no matter how well-intentioned, committed, and hard-working teachers may be, the Covid-19 pandemic introduced challenges that will have impacted the quality of teaching and learning. Inevitably, when faced with such increased demands and new challenges, teachers will need to prioritise and adopt coping strategies. One colleague told me that a much-heard phrase in conversations between teachers was 'it is what it is'. Inevitably, some things that were previously recognised as important, desirable, and/or good practice will be casualties of the emergency.

This article explores what seems a reasonable conjecture: in an emergency situation (such as being suddenly required to 'deliver' the curriculum in novel and unfamiliar ways), what will be sacrificed to 'make do' will be those things seen as desirable *but* difficult. These are likely to comprise those elements of teaching considered 'reform' practices. What is understood here as 'reform' is that which is still widely seen as novel and challenging and so often perceived as 'difficult' and perhaps even as luxury. What is *necessary* (for teachers) is to teach the curriculum. What is by contrast seen as *desirable* is to incorporate those aspects of good practice that are still yet to be fully consolidated into 'custom and practice' and are still conceptualised as reforms. Another term that might be used instead of 'reform' might be 'progressive'. It is suggested that those features of a teacher's work that are still perceived as reforms or progressive are most likely to be less robust and less resilient in response to stressors. The scenario offered in this essay may be considered to present hypotheses that can subsequently be tested in research on the impact of the pandemic on education in various contexts.

Progressive science education

The term 'progressive' implies going beyond what is currently taken as standard fare or the norm. Formal education - such as schooling - is a social phenomenon depending upon cultural institutions. What is introduced as a reform and seen as *progressive* in one cultural (e.g., national or institutional) context may be viewed as *unexceptional* or conversely *radical* elsewhere. Indeed, in terms of educational reform, it is likely that there is a common pattern of a proposal being initially seen as radical (as 'left-field') before it is later adopted as a reform and considered progressive, and then later still becomes custom and practice (see Figure 1).

Figure 1
Initially fragile features of practice become more robust over time



Educational norms shift

For example, consider how curricula have shifted over time and still vary somewhat in different parts of the world. The medieval university curriculum was at one time dominated by the common study of the trivium (grammar, logic, rhetoric) and then the quadrivium (arithmetic, astronomy, music, and geometry), whereas today the norm is that undergraduates specialise, and from a much wider range of subjects such as chemistry, art history, sociology, civil engineering, and so forth. Moreover, whether it is appropriate to have university degree courses in subjects such as media studies, sports science or, indeed, education has at various times been the matter of debate (and subjects accepted in some universities or countries would not be in others).

In the English system, an undergraduate would often focus on one discipline with a modest complement of subsidiary subjects (usually from fairly cognate disciplines). However, U.S. undergraduate courses often have a 'liberal studies' aspect such that a student may be required to study some science even if they are specialising in the humanities (Bourke et al., 2009). Chinese undergraduates are expected to study some aspects of a common curriculum such as mathematics, English, and state ideology (Zhang, 2012).

At one time, post-elementary school education in some countries took place in institutions known as 'grammar schools' - a term descriptive of their main focus, Latin grammar. No doubt, the addition of Greek would have initially been seen as a radical reform. The introduction of subjects such as the natural sciences into mainstream schools was also initially a progressive notion, which has become so taken for granted that any suggestion today that schools

should not teach science would seem bizarre (and, now indeed, radical). Again, such a change was not uniform across the globe; for example, when the teaching of natural science was still seen as a novelty in the English school system, an official government report (Schools Inquiry Commission, 1868) not only pointed to where the innovation was being adopted around the country, but also to how the (more progressive, in this sense) French, German, and Swiss school systems were already embedding this curriculum reform.

Fragile features of school science education

What is considered progressive not only changes over time but is also relative to local norms. In this article, I will identify and discuss two aspects of science education that I will conjecture can be widely considered progressive. That is, these two features represent aspects of science education which a) have been much discussed and championed in the literature, b) have been incorporated into educational reforms in a range of national contexts (although not yet globally fully adopted), but c) are still recent or current enough reforms in many contexts as not yet to be sufficiently consolidated into custom and practice to be robust enough to avoid disruption at a time of substantial challenges to the system. They might be considered progressive features that are still 'fragile' (see Figure 1), meaning those that lack 'resilience'.

Space does not here allow an account of how these features have been adopted to various degrees in different contexts. Discussion of how these progressive elements have been *nominally* formally adopted in the English curriculum context, yet in a way too superficial to support teachers in deep engagement, can be found in other articles (Taber, 2010, 2018b). One of these fragile progressive features relates primarily to curriculum and the other to pedagogy. I will describe each of these features, with some background on the arguments for their adoption in school science, and discuss why they might be considered fragile and so vulnerable when the school system is highly stressed through an emergency such as the global Covid-19 pandemic.

Progressive curriculum: teaching about the nature of science

The school science curriculum is organised and understood in somewhat different ways in different parts of the world (Taber & Vong, 2020). There have been various arguments about whether or when (i.e., for which age groups) science could be taught as a single subject ('general', 'coordinated' or 'integrated') rather than as discrete school subjects representing different

scientific disciplines (Jenkins, 2007). In the United States, it is quite common for earth science to be seen as a major division of school science alongside the biology, chemistry and physics that have long been seen as the main school science subjects in some other countries (Orion et al., 1999). Astronomy has been taught in some schools. Psychology has sometimes been accepted as a school science subject and, in some countries, geography is seen as a science (although, of course, we should be careful not to assume that labels such as 'geography' are understood to cover the same *range* of content everywhere).

At one time, in English schools, it was possible to take examination courses in subjects such as rural studies or engineering sciences. In some national contexts, mathematics has been seen as a science subject. In many parts of the world, there has been a focus on 'STEM' (science-technology-engineering-mathematics) or related notions (Chesky & Wolfmeyer, 2015), such as 'STEAM' incorporating agriculture (Sumida, 2018), as a curriculum area, whether seen as a higher-level subsuming category (within which science, or the sciences, will still be discretely taught) or a better focus for the school subject itself.

In part, the discussion behind the merits of making these different choices has been about the scope of natural science to be included in the school curriculum; but, clearly, another issue when considering (i) whether to combine or separate sciences or (ii) whether to form a unitary school subject of science with mathematics and technology, concerns what is common across the sciences. Whereas decisions about how much space science or earth science to include in school science are questions about disciplinary science content (i.e., the *products* of scientific activity), there has increasingly been a complementary focus on *scientific processes*. Put simply, this reflects the question of to what extent should school science education be about learning about some of the 'products' of professional science (the theories, the models, the laws, the typologies, the catalogues of 'facts', etc.), and to what extent should it be about learning about science *qua* science (e.g., as a set of practices within a professional community).

The complementary aims of education

There are various potential aims of school education, including facilitating progression to further education and employment; the development of generic areas of skill (such as critical thinking, problem-solving, creativity); the introduction to the key cultural domains valued by the society; supporting personal growth (cognitive, conceptual, ethical, physical, spiritual, etc.) of young people into happy and healthy adult individuals; and the production of citizens prepared to engage in the civil society (for example as voters or as responsible and informed consumers).

Curriculum choices should sensibly be informed by how these competing aims are prioritised. For example, a decision to pack the science curriculum with as much content as possible probably only makes good sense in terms of a focus on progression to higher education; *and then*, only for those competing for admission to tertiary level science-based courses; *and even then*, only as long as universities prescribe admissions requirements based on such a breadth of coverage in the curriculum. An in-depth focus on fewer topics might better support intellectual development by allowing greater engagement and more sophisticated treatment of topics; giving emphasis to the needs for informed citizens might also suggest a greater focus on a more select group of topics chosen in relation to societal priorities (e.g., healthy living, the environment, the climate, sustainability).

The NOS turn in science education

It has been widely suggested that the school science curriculum should focus more on what is often known as the nature of science or NOS (Allchin, 2013; Clough & Olson, 2008; Driver et al., 1996). Young people need to understand what science is and 'how it works' (Toplis, 2011), as this will be important for both the minority who become scientists as well as the rest who will engage with science as non-professionals who will vote, spend, recycle (or not), choose (e.g., medical treatments), and so forth in situations impacted by science.

NOS is contested, and scholarly accounts are subtle and nuanced, but there is a general consensus on key features that should be represented in school science (Lederman & Lederman, 2014). Just as many science topics traditionally taught have to be modelled and simplified in the curriculum to be suitable for presentation to school-age learners, curricular models of NOS can be developed (Taber, 2008). There is extensive literature about these issues, but here I offer one illustration.

The key topic of scientific knowledge

One of the biggest challenges for school science teachers is to offer learners a sense of the nature of scientific knowledge, which is largely conceptual and theoretical - and a key principle is that strictly it is always provisional. In principle, all scientific findings are open to being challenged in the future in the light of new evidence or new ways of thinking about the existing evidence (the Copernican revolution and Einstein's ideas about relativity were new ways of thinking that did not depend on any new data). However, we also want learners to appreciate that science is the most reliable means of learning about the natural world and that scientific knowledge is often a good guide to action. For example, Newton's laws of motion are rightly lauded as a major scientific

achievement and are still taught in schools today. They were widely considered definitive knowledge for two centuries, although we now know they are, strictly speaking, false (yet under most circumstances work well enough, e.g., in the calculations that allowed people to get to the moon and back safely).

The nature of scientific knowledge is not an easy topic to teach to school children - it is an aspect of the philosophy of science. However, if we want young people to understand, as one critical example, the nature of climate science and public policy debate about climate change, then this becomes essential. Science offers a strong consensus on the effects of anthropogenic inputs into the atmosphere, *albeit* a small minority of scientists do not accept that consensus. The best scientific models offer predictions, yet these are necessarily imprecise and probabilistic and are regularly revised, suggesting earlier versions were not quite right. It is easy for the layperson to listen to the scientific climate heretics, look at the imprecision and updating of predictions, and conclude that science does not yet 'know' and that we might best defer action until the scientific knowledge is definitive. So, children need to understand that provisional, theoretical knowledge is all we will ever have, and waiting until we know (with absolute certainty) before acting on the science is illogical and dangerous.

Learners should not believe scientific knowledge

It is also useful for teachers to keep in mind that if scientific knowledge is always conjectural and provisional, then it is not their role to ask learners to believe in it. Many people will have learnt scientific ideas at school that have since been demoted from the scientific canon. Science offers us useful ways to understand the world but not an absolute, eternal account. So teachers should ask learners *to understand* why an idea is useful and why scientists came to suggest it (i.e., in terms of evidence and arguments) but not to *believe* in the idea (Taber, 2017). As an example, it may be appropriate to teach that general relativity is the best currently available approach to understanding gravity, but it is not in the spirit of science to ask students to believe in the theory of general relativity. Similarly, teaching the 'lock-and-key' model of enzymes and substrates may be sensible as a useful way to think about enzymatic specificity, but it does not make sense to ask students to believe the model. Asking learners to believe in such things would reflect a category error as theories and models are not the kind of entities where belief-disbelief strictly applies, unlike factual claims about what is the case which can be considered to have truth values (e.g., the claim 'Slovenia is a monarchy' would be false).

Science education should include a focus on science as producing models and theories that are often useful in limited ranges of application (e.g., the

ideal gas equation) and have to be developed further before they can be applied more precisely or more widely. This would avoid a student, for example, learning a shell model of the atom as some kind of absolute truth, and then finding they are being asked to move beyond this and learn a different account (also just a model, and not an absolute truth): something that can be experienced as having been taught something 'wrong' which now needs to be 'unlearnt'.

Moreover, teachers in many contexts find they are teaching students who, for cultural and religious reasons, are committed to 'truths' that are inconsistent with some scientific ideas. The paradigm case here would be the rejection of macroevolution by natural selection by those who consider that their faith requires them to believe in the discrete special creations of different types of animal and plant groups (Reiss, 2008). Teachers cannot avoid the contradictions between these two perspectives (without abdicating their responsibility to teach the science, cf. Long, 2011), but there is a big difference between asking learners (a) to *believe in* macroevolution (which logically requires rejecting their faith) and (b) to *understand* the theory and appreciate the grounds on which it was suggested and why it has become the key organising idea in modern biology. The intellectual clash of ideas is just as great, but without asking for a commitment to a scientific theory as if it was a creed. (Just as in other areas of the curriculum the same students might be asked to *understand* the viewpoint and actions of a historical figure or of a fictitious protagonist of a novel without being asked to commit to their beliefs, views, or choices.)

The increased focus on the teaching of NOS may, *inter alia*, include more emphasis on enquiry, including historical case studies to show how scientific advances may be difficult and contested, rather than just the retrospective, whiggish, teaching of what has been called a 'rhetoric of conclusions' (Schwab, 1958, p. 375); and engaging with socio-scientific issues (Sadler, 2011) where science can *inform* social policy, but where decision-making also depends upon consideration of extra-scientific values (e.g., science might quantify the risks associated with building a nuclear waste storage facility or the cost of setting aside an area to protect at-risk species, but cannot tell society how much risk is acceptable, or what cost is worth paying).

It is widely recognised that there can be a considerable lag between the changing of a formal curriculum in terms of documentation and the full acceptance and enactment of the reforms (Peskova et al., 2019). The degree to which aspects of NOS have been incorporated into curriculum and teaching standards and have become part of local custom and practice varies internationally. In many places, this is still progressive and not yet a robust feature of teaching. Indeed, in the English curriculum context, contra international

trends, NOS was de-emphasised in the most recent curriculum revision (Brock & Taber, 2019).

It can be considered 'challenging' for many reasons, including (a) the teacher's own scientific education is often lacking in NOS; (b) in many countries high quality texts and teaching resources have not yet been developed to support this area of teaching; (c) teaching approaches may require different pedagogy and teaching skills from those most science teachers have mastered. For example, neutral chairing of a debate about a socio-scientific issue is quite different from teaching an area of established content; engaging with historical sources requires an interpretive approach open to multiple viewpoints, which is not the way science is usually taught. In many national contexts, teaching NOS is 'difficult' from the teacher perspective, and so is a 'fragile' aspect of the practice (cf. Figure 1). When under the stresses resulting from a crisis, it seems inevitable that there will be a reversion to focusing on teaching specific science topics for many teachers, so learning about NOS will suffer. That is, a reasonable hypothesis is that in some educational contexts, curriculum revisions to put more emphasis on learning about the nature of science may lack the resilience to be maintained during a period of systemic stress (and so it is likely that teaching about NOS was less extensive in these contexts during the year 2020 when the global Covid-19 pandemic disrupted education norms).

Progressive pedagogy: taking learners' conceptions into account

The other example I wish to highlight is teaching that takes into account learners' conceptions. The educational psychologist David Ausubel (1968) famously suggested that if he had to reduce the whole of educational psychology to one principle, it would be to find out what the learner already knew - and teach accordingly. This resonates in science education, where much research has highlighted how students commonly form alternative conceptions ('misconceptions') in science topics (Driver et al., 2013). Learners often come to school already having their proto-concepts about natural phenomena, and teaching is often either resisted due to being inconsistent with or inadvertently misinterpreted to fit with prior understandings (Gilbert et al., 1982). Commonly, teachers have to reshape learners' initial thinking, to challenge some alternative conceptions, and to find ways to constructively build upon learner intuitions to channel thinking in the desired directions (Driver & Oldham, 1986).

Again, there is vast literature regarding this (Taber, 2009), and it is not possible to do justice to this area of work here. There are various teaching

schemes and particular techniques that have been recommended for teachers. A key feature of the kind of teaching needed, which might be called constructivist teaching, is interactivity (Taber, 2018a). It starts with (à la Ausubel) diagnostic assessment to identify the students' current thinking. The teacher then seeks to persuade learners towards the scientific view, not simply by presenting that view but through demonstration, argument, discussion, metaphor, analogy, modelling, and other techniques (Hadžibegović & Sliško, 2013; Kress et al., 2001; Lemke, 1990; Mortimer & Scott, 2003).

Most importantly, the teacher constantly uses formative assessment to check how teaching is being understood, checking 'where is student thinking now?' The teaching needs to be dialogic (Mercer, 1995), meaning to have the form of a conversation where the learners' voices are heard. This has often been misunderstood as some kind of relativistic notion that all ideas are equally valued. The teacher *does* value the students' ideas but not because they are as worthy as scientific accounts, but because learning is always interpretive, incremental, and thus iterative (Taber, 2014), and the students' current thinking is the 'material' available to be worked with to bring about learning and conceptual change.

Again, this kind of approach has been adopted to varying extents in different places. In some parts of the world, the basic principles behind this type of science pedagogy have been reflected in teacher education, curriculum reforms, and official teacher guidance for some years. Effective practitioners present the scientific accounts, but as part of a choreographed practice of eliciting, reflecting, discussing, and challenging students' ideas, and giving learners frequent opportunities to reflect on and work with the ideas the teacher is presenting (Mortimer & Scott, 2003). This kind of teaching is, by its nature, conversational. It is like a symphony, shifting between themes (the received account, the different student notions) and shifting between different solo instruments and ensemble playing (teacher exposition, class discussion, individual reflection, paired and small group discussion).

Teacher talk is not all one-way: it is rich in questions and invitations for suggestions in order to ensure everyone is following, everyone understands, and everyone's ideas are getting a hearing. All ideas (whatever the source) are open to communal critique in terms of logic, evidence, argument structure, and coherence with other ideas we accept. This also models the core scientific value of questioning and testing all contributions on their merits. If this teaching style becomes too difficult, this means a less effective way of teaching science concepts and also the loss of an implicit way of reinforcing a key feature of NOS.

Again, in a time of great stress on schooling and teachers, it is likely that those practitioners who are less experienced at these techniques, where such

practice is still 'fragile', will readily slip back to 'teaching by telling'. Moreover, it seems likely here that even those teachers who have mastered such approaches and have made them part of their normal custom and practice (such that they can be considered 'robust' rather than 'fragile') may be challenged to teach in this way when faced with a class as a set of tiny muted headshots on a computer screen. That is, a reasonable hypothesis is that in some educational contexts, pedagogic reforms to better support student construction of knowledge through dialogic teaching may lack the resilience to be maintained during a period of systemic stress (so in these contexts it is likely that science teaching tended to revert to direct communication of the 'received' account during the year 2020 when the global Covid-19 pandemic disrupted education norms).

Perhaps, with the right technology, and time to test out teaching methods, it will prove just as effective to teach science, taking into account learners' ideas, via the Internet as it is in the classroom (Taber & Li, 2021). The use of chat rooms and the like can substitute for breaking the class into small groups for face to face discussion (and without groups distracting, or 'borrowing' from, each other). Wikis or shared glossary tools may be used to collect different learners' ideas and suggestions simultaneously, and possibly more effectively, rather than sequentially asking each learner or group in a classroom. However, even if that is true in principle, it will not be a straightforward transition but rather something that will require development and practise, just as any 'reform' does. So, *it may be* that teaching virtually is not in itself the challenge, but rather the sudden shift between classroom and virtual teaching without suitable warning and preparation. It is also *possible*, however, that distance learning (with the technology available today, at least) simply does not lend itself to effective science teaching as well as the classroom.

Conclusion

This article makes an argument that the stresses placed on the school system during the Covid-19 pandemic will inevitably impact the quality of the teaching and so student learning, and that this will disproportionally affect those aspects of teaching which might be seen as desirable but not essential to 'delivering' the curriculum, and which are felt more 'difficult' and so need to be put aside when seeking to 'make do' and 'get through' in a crisis. Well-established aspects of custom and practice are likely to be robust features of teacher practice, whereas elements associated with 'reform' and thus still seen as progressive are more 'fragile' and subject to being given a lower priority. An obvious challenge to science teaching in lock-down conditions is practical

laboratory work which, despite being a robust aspect of science teacher practice in most countries, presents major logistical challenges to moving online.

In this article, I have, however, focused on two other areas where I predict science teaching quality will have suffered, two areas that have over many years been much discussed in the literature and which have to varying degrees been adopted as aspects of educational reform in many national contexts. One prediction is that teaching about NOS will have suffered more than teaching science content in those contexts where teachers still find this a more challenging and/or peripheral aspect of their work. The other prediction is that the kind of dialogic teaching at the core of constructivist approaches which take into account learners' ideas, which is seen as critical to effective teaching of science concepts, and which relies upon teachers' interpersonal skills in making science lessons more like conversations than lectures, will prove more difficult online. For some science teachers, this will still be seen as a 'desirable' rather than 'necessary' aspect of their work, but even where this approach is well-established and so not as inherently fragile, the online mode is likely to encourage a shift back to teaching that is based more on a telling of the canonical account.

Hopefully, in time, there will be studies that explore the extent and nature of changes to teaching during the Covid-19 pandemic, and such research will help education systems become more robust in preparation for future crises that might require similar sudden changes in the organisation of teaching. If the findings of empirical work reflect the predictions made here, then part of that preparatory work should involve considering how one protects progressive elements of educational policy and practice in such circumstances. After all, reforms are made to improve teaching and learning, and so it is important to mitigate the fragility of those elements and seek 'reform resilience' in the face of stresses to the educational system.

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Biographical note

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The EU's Education Policy Response to the Covid-19 Pandemic: A Discourse and Content Analysis

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Following the severe impact of the Covid-19 pandemic on education systems in Europe, the EU has been called upon to provide a concerted response to the crisis in a context where member states provided their own diverse responses. Against this background, the aim of this article is to uncover and critically examine the EU's education policy discourse and promoted narratives since the outbreak of the Covid-19 pandemic, and by doing so evaluate the EU's response-ability for education recovery during the crisis. A conceptual framework has been devised to analyse the responsiveness of an international entity, such as the EU, based on organisational and neo-institutionalist theories. Data were collected through a combination of discourse analysis and computer-assisted content analysis, which was applied to official EU education policy documents published in 2020. The following categories emerged from the analysis process, indicating that the EU perceives education recovery as: "upskilling and reskilling", "digital transformation" and "sustainable development". The findings suggest a substantial continuation between the EU's pre- and post-Covid-19 strategy in the education sector, and even an acceleration in the same direction, revealing a lack of real change in the EU's response, which was focused predominantly on the economic and employability approach to education.

Keywords: Covid-19 pandemic, European Union, education recovery, response-ability, responsiveness

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Odziv izobraževalne politike EU na pandemijo covida-19: analiza diskurza in vsebine

Vasileios Symeonidis, Denis Francesconi in Evi Agostini

Močen vpliv pandemije covida-19 na izobraževalne sisteme v Evropi je spodbudil Evropsko unijo (EU) k usklajenemu odzivu na krizo v razmerah, v katerih so se države članice različno odzivale. Skladno s tem je cilj članka odkriti in kritično preučiti diskurz izobraževalne politike EU in spodbujene naracije od izbruha pandemije covida-19 ter s tem oceniti zmožnost odzivnosti EU na okrevanje izobraževanja med krizo. Da bi analizirali odzivnost mednarodnega subjekta, kot je EU, smo oblikovali konceptualni okvir, ki temelji na organizacijskih in neoinstitucionalističnih teorijah. Podatki so bili zbrani s kombinacijo analize diskurza in računalniško podprte analize vsebine, ki je bila uporabljena za uradne dokumente o izobraževalni politiki EU, objavljene leta 2020. V procesu analize so se izoblikovale kategorije, ki kažejo, da EU dojema okrevanje izobraževanja kot »nadgradnjo in prekvalifikacijo«, »digitalno preobrazbo« in »trajnostni razvoj«. Ugotovitve kažejo na precejšnje nadaljevanje strategije EU v izobraževalnem sektorju pred obdobjem in po obdobju covida-19 ter celo na pospešitev v isti smeri, kar razkriva pomanjkanje dejanskih sprememb v odzivu EU, ki je bil osredinjen predvsem na gospodarski in zaposljivostni pristop k izobraževanju.

Ključne besede: pandemija covida-19, Evropska unija, okrevanje izobraževanja, zmožnost odzivnosti, odzivnost

Introduction

The Covid-19 crisis is a systemic crisis that has created the largest disruption of education systems in history, impacting approximately 1.6 billion learners in more than 190 countries and all continents (United Nations, 2020). While the pandemic is still hitting large parts of the world – it is stated that Covid-19 has sharpened the precarious economic and social situation of millions of people all around the globe (Tcherneva, 2020) – some initial analysis and indications about its effects on education systems have already been proposed. For example, UNESCO (2020) states that the impact of Covid-19 will result in cutting government expenditure on education, having greater consequences for education systems than the great financial crisis of 2007/2008, particularly for low-income countries. Without drastic remedial action, the world could thus face a substantial setback to achieving inclusive and equitable quality education for all by 2030, as promoted by Sustainable Development Goal 4 (United Nations, 2015).

In Europe, the impact of the pandemic has also led to school closures that have brought significant disruptions to education. A report prepared by the European Commission's Joint Research Centre suggests that in a few selected EU countries, including France, Italy and Germany, students will face a non-symmetric learning loss that will have a negative influence on both cognitive and non-cognitive skill acquisition, as well as long-term consequences in addition to the short-term ones (Di Pietro et al., 2020). Despite the Covid-19 crisis being a transnational issue and a common challenge for European societies, country responses were indeed different and revealed the need for more coordinated responses by EU institutions (Iozzo & Masini, 2020; Schmidt, 2020). According to Grek and Landri (2021), the pandemic provoked the suspension of the mechanisms of European education governance, highlighting the limits of its fabrication, and a return to strong state-centred policies in education. The focus of the EU shifted to the support of member states and the decisions that had to be taken regarding school closures.

At the EU level, important decisions were taken when the Stability and Growth Pact was suspended for the first time in March 2020, and when a long-term EU budget (€1.8 trillion) and a recovery plan called Next Generation EU (€750 billion) was agreed between EU member states in July 2020. Despite initial hesitation, these initiatives opened a space of possibilities, showing that EU leaders gave priority to the protection of their citizens, suspending the dominant economic regime (Grek & Landri, 2021). Tied with the new budget and the Next Generation EU plan, the European Commission (EC) updated its education

strategy for the new European Education Area to be established by 2025 (EC, 2020a), an initiative introduced in 2017 by the Junker Commission. While the Directorate General for Education and Culture's response has been limited to the provision of online materials for learning, the EC recently introduced the European Skills Agenda (EC, 2020b) and the Digital Education Action Plan (EC, 2020c) as measures to improve the resilience of education systems and increase the use of digital technology and learning among member states. Promoting skill acquisition and digital education is not a novelty for the EU education policy agenda (see Panitsides & Anastasiadou, 2015; Salajan, 2019), but the interest of the EU in these themes has now arguably accelerated due to the pandemic.

The pandemic presents an opportunity for the EU to rethink its priorities on a highly contested issue such as education, much as it has for the economy. It has been argued that EU's education policies promote the neoliberal ideas of "education for the economy" with limited space for the dimension of "social Europe" (Alexiadou et al., 2010, p. 347). Such policies tend to emphasise the contribution of education to building competitive economies and creating skilled workers to produce benefits in the labour market, which are perceived by some scholars as the main factors causing social inequality (Muñoz, 2015; Panitsides & Anastasiadou, 2015). In this context, the pandemic, which has evidently exposed and exacerbated inequalities in Europe (Di Pietro et al., 2020), could prompt a rethink of the social dimension of European education policy. Since 2017, the EC has endeavoured to make the social dimension of the EU visible through several initiatives that culminated in the development of the European Pillar of Social Rights (European Parliament, Council of the European Union & European Commission, 2017). Among its 20 principles for a Europe that is "fair, inclusive and full of opportunity" (EC, n.d.), the first principle relates to education, training and lifelong learning and is connected to the European Skills Agenda (EC, 2020b).

Against this background, the aim of the present study is to examine the EU's education policy discourse and promoted narratives since the outbreak of the Covid-19 pandemic. The policy documents produced during this recent period highlight some new priorities that will influence the remaking of the European space of education in the twenty-first century. According to Grek and Landri (2021, p. 397): "these documents represent a new strategy to restore the 'magister of influence' of the EU on the education systems of member states, after the pandemic catastrophe". The objectives of the present study are thus to: (a) identify and analyse the discourses underpinning EU education policy documents published in the context of the Covid-19 pandemic; (b) evaluate the extent to which these discourses reproduce the existing priorities of the EU

in education or define new ones; and (c) evaluate if and how these discourses contribute to the vision of a new "Social Europe" as mandated by the European Pillar of Social Rights. In doing so, the article helps to understand the principles and values that will be central to post-pandemic education policy at the EU level, adding to the rich body of knowledge that has emerged regarding the impact of Covid-19 on education systems.

Conceptualising the EU's response-ability in education and training

In order to frame the response-ability of the EU, we should first conceptualise its role in monitoring education policymaking across member states. A unique feature of the EU is that although the member states remain sovereign and independent states, they have delegated some of their decision-making powers to the shared institutions they have created, so that some decisions of common interest can be made at the EU level. Considering this particular nature of the EU, we draw on organisational and neo-institutional theories and propose a conceptual framework for interpreting the EU's policy discourse for education recovery during the Covid-19 pandemic.

The EU's role and responsibility for education

At the outset, we should clarify the role and mandate of the EU for national educational issues. In Europe, education has historically been closely connected to nation and state building, and has thus been perceived as an area of legitimate national diversity (Gornitzka, 2006). For almost twenty years after the signing of the Treaty of Rome in 1957, education remained a "taboo" topic (Pépin, 2007, p. 122) and it was not until 1976 that a European Council resolution introduced the voluntary participation of education ministers in the classical procedures of the European Community (Council of the European Communities, 1976). Since then, the European level's responsibility has been focused on mobility, which was strengthened with the establishment of the Erasmus programme in 1987 and the Socrates programme in 1995 (Gornitzka, 2006). With the signing of the Maastricht Treaty in 1992, school education was included in the Community's action programme, but any harmonisation was ruled out and member states remained solely responsible for their education systems:

> The Union shall contribute to the development of quality education by encouraging cooperation between Member States and, if necessary, by

> supporting and supplementing their action, while fully respecting the responsibility of the Member States for the content of teaching and the organisation of education systems and their cultural and linguistic diversity. (Treaty on European Union, 1992, Article 126)

The specific article recognises some limited powers of the EU over education, mainly by using the term "quality education" as an area that permits intervention by the EU (Alexiadou, 2007). Until today, nothing in the formal legal parameters has changed in the Treaty when it comes to the principle of subsidiarity and the fact that the EU can only encourage cooperation between member states. In the area of vocational education and training (VET), the situation is different considering that the EU has a stronger legal foundation already from the founding Treaty. In general, education belongs to the "soft" legal competence of the EU, meaning that the EU can propose measures "which are binding on the member states in varying degrees, but which are not compliance-driven in the form of directives, regulations or decisions" (Gaenzle, 2008, p. 4). In contrast to direct or "hard" EU policy, which results in legislation that member states are obliged to implement, soft policy depends on the member states making and implementing proposals, while the EC may have a monitoring role regarding the actual output (Ladrech, 2010).

Since the Lisbon Council in 2000, EU cooperation in education and training has intensified under the umbrella framework of lifelong learning and a new (for the field of education and training) governance instrument for Europeanisation, the Open Method of Coordination (OMC). The OMC has allowed for a degree of EU intervention in national education and other social policy areas that would have been inconceivable before (Hingel, 2001). The aim of the OMC is to spread best practices and lead to convergence towards the main EU goals (European Council, 2000). Among its core characteristics, Alexiadou (2007) refers to the education OMC: (a) as a form of soft law and hence a "light touch" regulatory tool; (b) as a "reflexive" tool of governance, drawing on peer review and policy learning; (c) as involving a range of "actors" in its process of policy learning and exchange, including networks of experts in various fields within education; and (d) as operating on the basis of benchmarks and indicators to stimulate exchange and discussion between member states about reasons for differences in performance (pp. 104–105).

However, the Lisbon agenda "does not acknowledge education as a 'teleological' policy area, an area in itself", but rather as "part of social policy, labour market policy and overall economic policy" (Gornitzka, 2005, p. 17). Similarly, Halász (2013) argues that the European interest in education originates from

pressures of the wider social policy area, particularly the employment area. In this context, the education OMC seems to contribute more to the goal of "sustainable economic growth" and less to the social cohesion goals of the Lisbon agenda, while following a traditional set of managerial values with strong business orientation informing education indicators (Alexiadou, 2007). Besides, the OMC developed initially as part of economic policy coordination, given impetus through the European Employment Strategy, rather than as an independent policy field (Gornitzka, 2005).

Nevertheless, the wider integration process has intensified and formalised through the OMC, resulting in the emergence of a "European Education Space" and a "European Education Policy" developed within particular historical, economic, political and educational contexts, which allowed education to find its "place" in European policy (Dale, 2009). According to Dale (2009), European education policy is framed not only by the OMC and the respective Directorate General, "but by existing Member State policies and preferences – and, in addition […] existing conceptions of the nature and capacity of 'education' which, […], have an existence that is relatively independent of, and pervade, in different ways, all Member State education policies" (p. 32). Based on this distinct idea of a European education policy, the following section presents a conceptual framework for the interpretation of the EU's policy discourse during the Covid-19 pandemic.

Using organisational theory and neo-institutionalism to analyse European responses to the Covid-19 pandemic

Responsiveness has proven not only to be a crucial individual (e.g., Waldenfels, 2012), but also an organisational (cap)ability (Jesacher-Roessler & Agostini, 2021). Organisational theory conceptualises responsiveness as an emergent capability that results from interorganisational practices drawing on different structural properties of networks and clusters (Gärtner et al., 2017). Hence, Gärtner and colleagues (2017, p. 16) define responsiveness "as the capability that ensures timely reconfigurations of value systems and that is established among organisational actors from different levels, i.e. organisation, network, and cluster", as well as an "act of sensing [...], seizing opportunities and reconfiguring organisational resources and routines" (Gärtner et al., 2017, p. 8). Organisational (re-)actions involve attempts to influence changes as they evolve. Thus, organisational theory emphasises the active dimension of responding to change and highlights the central role of interorganisational practices or actions that are geared not only towards reconfiguring operative

routines, but also towards taking responsibility and gaining legitimacy. In responsive organisation theory, an organisation must learn about the needs and logics of action of internal and external stakeholders.

Ortmann (2010) stresses that the "responding to" of organisations means more than merely reacting, as it involves answering signals and others' concerns while taking responsibility for one's answer. In turn, by responding, organisations shape and influence what is "at stake". In this context, on the one hand, Ortmann (2010) refers to organisations' perceptiveness for mainly unforeseeable but (possibly) strategically relevant discontinuities in the face of unexpected dangers, opportunities or crises. On the other hand, he points to the responsiveness of an organisation when its actions take into account the needs of those affected by those actions. Thus, the organisations' response-ability is mediated by interpretation (meaning) and language, involving the imperatives of both the thing – the situation, the context, the environment – and of communication and cooperation as well as the "claim of the other". In this sense, every response to the claim of the other always brings with it some kind of responsibility.

Summing up, organisations' responsiveness is about being perceptive to stakeholder concerns as well as to the situation and context, and being willing to continually work on different issues, with the aim of influencing change by actively shaping what is "at stake" (Gärtner et al., 2017; Ortmann, 2010). These different modes of influencing "can range from opposing or manipulating to compromising and affirming" (Gärtner et al., 2017, p. 12). What they all have in common is that the course of action and its outcomes need to gain legitimacy within a system of norms, values, beliefs and definitions (Suchman, 1995). Thus, social actors try to accomplish actions that seem to be appropriate or desirable. The fact that organisations can influence which change comes into being creates the need for taking responsibility for these influences and trying to ensure their legitimacy. In the context of our study, it is therefore important to understand that responsiveness is not just developed inside an organisation, but creates value in a network of stakeholders as well as in certain environments and must address different logics of action in order to respond adequately and as requested to crises such as the Covid-19 pandemic. In this sense, the EU as a particular supranational institution has to respond to the norms and regulations of the context as well as to the claims of its stakeholders, e.g., the member states, especially when it comes to soft EU policy actions.

The strategies and modalities that the EU has adopted to "respond" to external and internal shocks like the pandemic were constrained by the short time available due to the emergency situation – which required an immediate

response – and by the chaos generated by the pandemic – which created disorder, uncertainty and fear at any level, institutional and individual. However, a complex institutional organisation such as the EU has a long history of responses to crisis (Schmidt, 2020) and has accumulated knowledge in this regard. In evaluating responses to the Covid-19 pandemic, Schmidt (2020) argues that EU governance in the Covid-19 crisis may very well result in paradigmatic change toward deeper European integration in some areas, incremental change in others, or even reversal toward dis-integration in yet others. It is therefore important to consider what changed in terms of the policies and how and who was responsible for it during the pandemic and why. To this end, Schmidt (2020) suggests a methodologically pluralist approach, in which different neo-institutionalist analytic frameworks can be useful.

Firstly, historical institutionalism helps to map out the continued regularities, incremental changes and paradigm shifts prior to and during the Covid-19 pandemic (Schmidt, 2020). The focus of historical institutionalism is on institutions, which are understood as "sets of regularized practices with rule-like qualities" and are conceptualised as structures external to political economic actors (Schmidt, 2008a, p. 4). The dominant macro-historical approach tends to emphasise structures and processes much more than the events out of which they are constructed, overlooking the individuals who created those events (Schmidt 2008a). Historical institutional analysis thus helps to describe the kinds of policies put in place in response to some critical junctures, but it lacks the tools to explain them (Schmidt 2020; 2008a, 2008b). Relevant actors need to recognise that something is indeed a critical juncture, and that change is required (Schmidt, 2020). This is why many scholars who employ historical institutionalism to describe "what happened" also add a discursive institutionalist analysis of "who did what why" (Schmidt, 2020). Discursive institutionalism focuses on the substantive content of agents' ideas and/or on the interactive processes that serve to generate those ideas and communicate them to the public (Schmidt, 2008a). As such, discursive institutionalism can help to reveal the reasons and reasoning behind what happened by turning to the agents of change. In the case of EU agents, there is a lot of debate as to who is driving the process of change, with some intergovernmentalists assuming that member state leaders in the Council are in charge and others arguing that the Commission and other EU bodies remain in control (Schmidt, 2020).

In education, as examined above, Europeanisation is neither a linear nor a straightforward process (Alexiadou, 2007), but rather a reciprocal relationship between political negotiations at the domestic and the European level. Domestic actors draw on EU resources and modify power relations, meaning

that instead of a causal chain going down from the EU to the domestic level, it is more appropriate to consider that there are multiple ways through which EU pressure is refracted, amplified or construed (Radaelli & Pasquier, 2008). Besides, there are various actors and institutions within member states that do not act in a coordinated way and may respond very differently to European pressures. In order to frame our analysis of EU discourses on Covid-19 and education, we have thus adopted the following lenses by combining organisational theory and neo-institutionalist approaches:

- Historical precedence and existing institutional structures (as in historical institutionalism);
- Organisational norms, rules and dominant ways of working (see, for example, Gärtner et al., 2017; Ortmann, 2010); and
- New – or old recycled – ideas that are used to effect reforms and frame actual responses (see, for instance, Schmidt 2008a, 2008b on discursive institutionalism)

If we acknowledge that in order to understand the responsiveness of the EU to the Covid-19 pandemic in the particular area of education, research needs to consider both the organisational conditions and the actors' subjective interpretation of these conditions, we bring attention to the concept of discourse. According to Schmidt (2008a,b), discourse is a more versatile and overarching concept than ideas, encompassing not only the substantive content of ideas but also the interactive processes by which ideas are conveyed. It is thus not only "what is said" but also the context of "where, when, how, and why it was said" (Schmidt, 2008b, p. 305).

Method

In order to analyse the EU's education policy responses to the Covid-19 pandemic, we combined discourse analysis with computer assisted content analysis (Bennett, 2015). According to Bennet (2015), the combination of these two methods is promising, since both are text-focused methods that can meaningfully complement each other, taking advantage of recent developments in information technology and the growth in the availability of searchable and machine-readable digital text in the last two decades. Computer-assisted content analysis is used to track the frequency of particular words across texts, helping us to identify relevant patterns, while discourse analysis allows us to interpret these patterns in the wider social context. The first is usually considered as a quantitative method that can identify texts worthy of close study and

address whether the findings of individual texts are also evident in populations of texts. The second is perceived as a qualitative method that can contribute to conceptual validity and an in-depth understanding of individual texts. In this study, computer-assisted content analysis was first conducted to identify the most relevant texts and passages, as well as the frequency of words and phrases, which were then interpreted through discourse analysis.

Specifically, a document search was initially conducted in the EUR-Lex official documents database (https://eur-lex.europa.eu/homepage.html), running a search for EU-law documents authored by the European Commission during the year 2020, with "Covid" AND "Education" as title and in-text keywords. The results yielded a set of 19 documents, of which three European Commission Communications and one Proposal for a Council Recommendation were selected as relevant responses of the EU to the impact of the Covid-19 pandemic in education and training (Table 1). The September 2020 Commission Communication is the first major education communication of the new Von der Leyen Commission, which committed to making the European Education Area a reality by 2025. It is also the document that aims to present a "replacement" to the Education and Training 2020 framework for education, promoting the commitments of the new Commission towards the digital and green transitions (von der Leyen, 2019). This Commission launched itself in 2019 as the "Green Commission" with a Digital EU Agenda, which has been very much welcomed by the Parliament and several environmental organisations and Green political parties across Europe.

In this respect, the other two 2020 Communications on the European Skills Agenda and the Digital Education Action Plan build on previous action plans (i.e., the Skills Agenda adopted in 2016 and the Digital Education Action Plan 2018–2020), but they are both tied to the Next Generation EU plan and the effort to recover from the Covid-19 pandemic. While both of these initiatives were already in place before the pandemic, Covid-19 acted as an accelerator and introduced new priorities, such as the attention to the "green recovery", leading to a new strategy of the EU for the education systems of member states after the pandemic (Grek & Landri, 2021, p. 397). The European Skills Agenda is managed by the Directorate General for Employment, Social Affairs and Inclusion and is aimed at strengthening sustainable competitiveness as stipulated by the European Green Deal and ensuring access to training and lifelong learning for all according to the European Pillar of Social Rights (EC, 2020b). The Digital Education Action Plan is more closely linked to the priorities of the European Education Area, which is presented as an initiative that develops in parallel to the European Skills Agenda, the renewed VET policy and

the European Research Area. The final document examined, the proposal for a Council Recommendation on VET, also aims to support the European Pillar of Social Rights and take the common vocational training policy one step further since the launch of the Copenhagen process in 2002.

Table 1
List of selected policy documents for this study

Title	Acronym used in text
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on achieving the European Education Area by 2025.	EC, 2020a
European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience.	EC, 2020b
Digital Education Action Plan 2021–2027. Resetting Education and Training for the Digital Age.	EC, 2020c
Proposal for a Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience.	EC, 2020d

After selecting the specific documents, a single word frequency search was conducted across the dataset with the assistance of the software MAXQDA. The search was limited to the 25 most frequently occurring words containing more than three letters and excluding generic vocabulary with a "stop list" (e.g., and, for, the). A word combinations search was also conducted with two and three words, respectively, applying the same rules as the single word search. The first effort to group patterns into analytical categories resulted in five discursive bundles that were then reduced to three after thirty percent of the material had been analysed following an inductive content analysis of the texts. As shown in Table 2, the three discursive bundles attempt to define the emerging discourses of the EU with regard to education recovery, which is the central notion framing the context of the examined documents. Education recovery thus emerges as discourse of "upskilling and reskilling", "digital transformation" and "sustainable development".

It is not surprising that words such as "skills", "digital" and "green" appear most frequently in the examined policy documents, since these words essentially reflect the headlines of the Commission and Council strategic actions. It is interesting, however, to notice the interplay between the specific words and the ideas of "recovery" and "resilience", which are in effect the post-pandemic objectives of the EU. Each discursive bundle predominantly reveals considerations of "what is said" in relation to education recovery, indicating

similarities with respect to promoting skills and preparing for the green and digital transitions.

Table 2

Emerging discourses for this study: Education recovery as…

Category	Vocabulary	Frequency	%	Rank	Documents
Upskilling and reskilling	Skills	472	1.55	2	4
	Labour market	60	.38	7	4
	Quality assurance	50	.32	8	4
	Lifelong learning	41	.26	9	4
	Skills agenda	30	.19	12	4
	Learning outcomes	22	.14	19	4
	European skills agenda	10	.13	9	4
	National skills strategy	9	.12	10	2
	Labour market relevance	6	.08	24	2
Digital transformation	Digital	474	1.55	2	4
	Digital skills	82	.52	3	4
	Digital education	72	.45	6	4
	Digital transitions	28	.18	15	4
	Digital technologies	21	.13	21	4
	Digital education action	12	.16	6	4
	Advanced digital skills	11	.15	8	3
	Basic digital skills	9	.12	10	3
	Digital Europe programme	8	.11	16	3
	Digital education ecosystem	6	.08	24	2
Sustainable development	Green	101	.33	19	4
	European green deal	14	.19	3	4
	Sustainable competitiveness social	14	.19	3	4
	Sustainable development goals	8	.11	16	3

Based on the content analysis, an interpretative discourse analysis of the policy documents helped to reveal the context and the "where, when, how, and why it was said" (Schmidt, 2008b, p. 305). Although effort is devoted to addressing all contextual aspects, explanation of how and why will be attempted at a more superficial level, because of the difficulty of making causal claims only through documents and without access to social actors' own perspectives. Nevertheless, the discursive approach can offer valuable insights into the nature of the EU's education policy responses and, in combination with organisational

theory and neo-institutionalism, the ways in which particular concepts become incorporated as appropriate and legitimate in the practice and discourse of policymakers (Alexiadou, 2007).

At this point, we should also acknowledge some limitations of the study. Firstly, the data collected consist of only a few documents. This implicates the examination of four policy documents with direct reference to education and the impact of Covid-19 produced in 2020. It must be said that we are still in the middle of the pandemic and not many official European documents are available on this specific topic. More documents will surely be released in the near future and further empirical analysis will be necessary. Another limitation of this study lies in the restriction to particular methodological and theoretical frameworks, which do not allow for generalisation across the range of similar policy documents from other institutions and comparison with other empirical studies. Finally, we concede that we cannot make claims beyond the results of the relatively small number of documents in this study.

Results

Education recovery as upskilling and reskilling

The word "skills" was the third most frequent word appearing in the single word frequency search across all of the EU policy documents examined. When the specific word was combined with another one, the most frequent results were "digital skills" and "skills agenda". It is perhaps not surprising that the EU places such a strong emphasis on skills when it comes to describing the actions for education recovery following the Covid-19 pandemic. The European interest in education originates from pressures of the employment area, and the EU often extends the scope of employment policies to cover aspects belonging to the education sector (Dale, 2009; Halász, 2013; Symeonidis, 2021). From the moment that the Lisbon European Council in 2000 reframed education policies to foster a "knowledge economy", education has been assigned the role of providing a flexible and up-to-date workforce (Panitsides & Anastasiadou, 2015). The Covid-19 crisis has further exacerbated this approach, whereby education appears to be the means for upskilling and reskilling a competitive workforce that can in turn contribute to Europe's economic recovery and social prosperity. "As Europe sets on its path to recovery, the need to improve and adapt skills becomes an imperative" (EC, 2020b, p. 1). To this end, the Commission has mobilised significant funding schemes to invest in skills, including the Next Generation EU instrument, which are available to member states for financing skills policies.

Successive EU skills agendas have argued about the need to raise skills levels in Europe to tackle the challenges of increasing productivity and competitiveness, technological change and social inclusion (Hogarth, 2021). Upskilling and reskilling appears as a common priority already from the 2016 New Skills Agenda, which introduced the Upskilling Pathways designed to help adults acquire basic competences in literacy, numeracy and digital skills, as well as a broader set of skills, by working towards an upper secondary qualification (EC, 2016). The specific aim of upskilling and reskilling has also been boosted by the first principle of the European Pillar of Social Rights (European Parliament, Council of the European Union & European Commission, 2017). In the context of the Covid-19 pandemic, however, this discourse appears more urgent than before because of high unemployment rates and constrained budgets. The latest European Skills Agenda argues with emphasis: "now, more than ever, the EU needs a paradigm-shift on skills" (EC, 2020b, p. 3). Although member states have introduced policies to upskill their workforce and, for example, have attracted skilled workers from outside Europe, the latter can prove challenging in contexts of increasing unemployment (Hogarth, 2021).

Across policy texts, the discourse on skills is included under the umbrella framework of lifelong learning and social fairness, revealing the Commission's effort to find a balance between the ideas of labour market flexibility and social justice, with emphasis traditionally placed on the first rather than the second objective (Panitsides & Anastasiadou, 2015). Skills and lifelong learning are presented as the drivers of the Union's ambition for a green and digital transition, meaning that Europe should become climate-neutral by 2050 and a global leader in digital innovation. "The EU needs a skills revolution to ensure people can thrive in the green and digital transitions, and to help in the recovery from the coronavirus pandemic" (EC, 2020e, p. 1). In effect, the Commission recognises the deficit of many European countries with regard to facing the challenges of distance education and the emergence of new inequalities, since many people lack digital skills or attend schools with limited or non-existent digital infrastructure (EC, 2020b; 2020c). Thus, ensuring inclusiveness and social fairness when it comes to skill acquisition becomes a central message in all of the examined policy documents and translates into making sure that no one is left behind following the coronavirus crisis. The balancing act between the objectives of the lifelong learning policy and the cohesion policy has been crystallised in the European Skills Agenda as a benchmark: "By 2025, 14 million adults with low qualifications in the EU should participate in learning every year" (EC, 2020b, p. 19).

This so-called "paradigm-shift on skills" would also require building resilience (EC, 2020b, p. 1), a concept repeated several times to indicate the

ability of the workforce to learn and adapt in the face of crisis, both personally and professionally. Improving resilience particularly through digital skills is considered a prerequisite to thriving in a technology-driven economy (EC, 2020b; 2020d). Resilience becomes the purpose of VET, along with the notions of sustainable competitiveness and social fairness in the current pandemic era (EC, 2020d). Evidently, the Commission understands VET as the main mechanism to meet the Union's upskilling and reskilling needs, and in this sense "to support the recovery from the COVID-19 pandemic and contribute to building a more sustainable, fair and resilient European Union" (EC, 2020d, p. 3). The Commission also considers that supporting European VET as a global reference point in skills development – through, for example, the establishment of Centres of Vocational Excellence – can improve Europe's economic competitiveness at a global scale.

Skill acquisition also appears as a central priority of the European Education Area to be established until 2025. Already before the outbreak of the pandemic, Ministers of Education and Ministers of Finance met for the first time together on 8 November 2019 and agreed that "investing in education, skills and competences is a necessity for all member states and it should be a strategic priority for the EU" (EC, 2020a, p. 4). Skills define the understanding of the Commission regarding quality education, since "mastering of basic skills, including digital competences" and "mastering transversal skills" are the first two objectives that should guide the dimension of quality for developing the European Education Area (EC, 2020a, pp. 5–6). The term quality is consistently employed by the EU as "an entrance to the education sector" (Alexiadou, 2007, p. 106), allowing the Commission to coordinate member states' actions on education, and thus to intervene in an area that is generally considered to be of national concern. By placing skills at the centre of what is considered to be quality education, the aspects of knowledge and attitudes are overlooked, and a plethora of adjectives comes to concretise the various facets of the term, including basic, transversal, digital, technical, entrepreneurial and life skills.

In order to recognise skill acquisition achieved in different contexts, the Commission promotes learning mobility and initiatives for transferring micro-credentials across the EU. In this regard, the Bologna process has been instrumental in opening up higher education to internationalisation and mobility, leading to convergences in terms of the recognition of formal qualifications and the adoption of the learning outcomes approach across member states (Halász, 2017; Symeonidis 2021). In all of the examined documents, the Commission recognises that mobility increases employability and improves people's career prospects. However, we are not talking anymore solely about physical mobility.

Considering the new realities brought about by the pandemic, "blended mobility" will be integrated into the Erasmus programme by adding a virtual learning component to Erasmus and supporting initiatives such as eTwinning for schools (EC, 2020c, p. 18). In order to enable this kind of mobility, a common European approach to the validation and recognition of qualifications is highlighted as necessary. This is where micro-credentials emerge as a more flexible approach, implying the modularisation of higher education or VET programmes through learning outcomes. However, this flexibility bears the risk of making traditional degrees obsolete, since according to the Commission:

> A growing number of adults, with or without a higher education degree, will need to reskill and upskill through more flexible alternatives than a full degree in order to overcome the gap between the learning outcomes of their initial formal qualifications and emerging skills needs in the labour market. (EC, 2020a, p. 16)

In order to avoid such risks, the Commission raises the notion of quality assurance several times and suggests the development of a "European Recognition and Quality Assurance System", as well as further integration of education and training priorities in the European Semester, which is the EU's instrument for annual economic and fiscal coordination of member states (EC, 2020a, 2020b, 2020d). In one text passage, we can see that such monitoring measures appear as a remedy to the crisis: "Third, the enabling framework will foster integration of education and training in the European Semester to reinforce Member States' capacities to recover from the Covid-19 crisis" (EC, 2020a, p. 26). The rise of such quality assurance and evaluation mechanisms at the EU level has previously been criticised as an approach centred on productivity that values the quantitative measurement of predetermined outcomes (Brady & Bates, 2016; Grek et al., 2009). From a governance perspective, such an approach to quality assurance tends to define certain objects and obscure and hide others for governance purposes (Grek et al., 2009). Linked to the European Semester, the creation of such a quality assurance system will further exacerbate the overarching rationale for data production in terms of both accountability and increased performance. It will also bring education closer to the employment and economic sectors of the EU, where the Union has competences to provide arrangements within which member states must coordinate policy.

Finally, education recovery would arguably not be possible without teachers and trainers, whose competency and professional development is another dimension guiding the European Education Area (EC, 2020a). Teacher professional development is conceptualised within the skill acquisition

discourse, meaning that professional development should equip teachers with the competences necessary for the twin green and digital transitions, but without defining what kind of competences these should be. The attractiveness of the education profession and its overall social status is connected to the idea of a highly competent profession that supports career progression through the diversification of career opportunities for teachers, trainers and school leaders (EC, 2020a, p. 19). In order to enable the career progression of education professionals, the Commission proposed the development of European guidance for the establishment of national career frameworks during 2021–2022 (EC, 2020a, p. 20). It is a long-standing policy of the Commission to link teacher professional development and career progression with measurable competences (Symeonidis, 2021), an approach interpreted by some researchers as an effort by governments to control teachers by holding them accountable for student outcomes (see Trippestad et al., 2017).

Education recovery as digital transformation

"Digital skills" emerged as the third most frequent pair of words across all of the examined documents, with the word "digital" coming second to the word "education" in the single word frequency search. The Commission considers the Covid-19 crisis as a learning opportunity for education and training systems in Europe because it accelerated the digital transformation in education, which had already been taking place over recent years (EC, 2020c). "The COVID-19 crisis has brought greater awareness of the need to improve the use of technology in education and training; to adapt pedagogies and develop digital skills" (EC, 2020c, p. 8). According to the Commission, this is not merely a change process, but rather a transformation of education and training systems that takes time and requires investment and the political will to move forward. It is considered a task for the whole of society and should be based on dialogue between the relevant stakeholders, as well as evidence-based monitoring (EC, 2020c). An open public consultation for the Digital Education Action Plan thus took place and several stakeholders expressed their learning experiences during the pandemic (see EC, 2020c)

What becomes clear from the analysis of the policy documents is that the Covid-19 pandemic merely offered the opportunity for advancing the digital agenda in education, since policies about digital education or learning at EU level date back to 1994 (Salajan, 2019). Well before the pandemic, the digitisation of education policy and practice had established itself as a key instrument for the datafication of education, which is the broader process of producing education

data intended to make systems visible, commensurable and comparable (Grek & Landri, 2021). However, the intention to enhance datafication is now presented as a way to repair education systems and help them recover (see EC, 2020c).

The urgency of making the digital leap in education is considered "vital for people to achieve their potential without leaving anyone behind" (EC, 2020c, p. 20). Like the category of "upskilling and reskilling", the concepts of "equality" and "inclusiveness" are often repeated in the narrative of the EU to justify policy formulation. Not leaving anyone behind is a central argument for investing in digital education during the Covid-19 era: "Appropriate investment in connectivity, equipment and organisational capacity and skills should ensure that everybody has access to digital education" (EC, 2020c, p. 8). At the core of digital education again lies the discourse around the flexible skills and competences that individuals need in order to face the uncertainties of an increasingly digital economy. This is why basic digital skills are promoted as transferable skills that every citizen should have (EC, 2020c), while a strong focus of the European Education Area is placed on fostering advanced digital skills through specialised education programmes, such as artificial intelligence, cybersecurity and high performance computing (EC, 2020a, p. 12).

It is interesting to note that in some text passages, the Commission envisages placing digital education beyond a mere Science, Technology, Engineering and Mathematics (STEM) approach and towards an ethical perspective. "High quality and inclusive digital education, which respects the protection of personal data and ethics, needs to be a strategic goal of all bodies and agencies active in education and training" (EC, 2020c, p. 8). This is also where the green dimension of digital skills becomes relevant, showcasing the Commission's intention to link the ideas of skill acquisition, digital transformation and sustainable development in any possible occasion. In essence, the European policy space in education becomes a space for developing policy solutions to emerging societal challenges in Europe, such as the green and digital transitions accelerated by the Covid-19 pandemic. Digital education and skills should also contribute to digital literacy and resilience: "Being digitally skilled and acquiring digital literacy can empower people of all ages to be more resilient, improve participation in democratic life and stay safe and secure online" (EC, 2020c, p. 13). Here resilience implies the competence to critically assess information, identify disinformation and manage the overload of information, which are exacerbated in times of crisis.

In addition to equipping learners with digital skills, the purpose of digital education is considered to be the deployment of digital technologies to support teaching and learning processes through, for example, distance and

blended learning (EC, 2020c). "Digital technology should be harnessed to facilitate the provision of flexible, accessible learning opportunities, including for adult learners and professionals, helping them to re-skill, upskill or change careers" (EC, 2020c, p. 10). Digital technologies can thus enable the flexibility and transfer of qualifications, supporting the European approach to micro-credentials described above. This is one example of how digital technologies can become instrumental in furthering convergences among member states. Another example includes the development of European digital educational content, "which should promote the highest pedagogical and educational quality and respect the diversity and cultural richness of the Member States" (EC, 2020c, p. 10). In order to argue in favour of such convergences, which fall behind the legal competences of the EU, the Commission refers to the potential of digital education to increase the international outreach of the EU. "Digital education initiatives have the potential to help strengthen relations between the partner countries and the EU, but also to strengthen relations within different non-EU regions" (EC, 2020c, p. 19). However, it is also recognised that digital technologies are not fully exploited in member states and that there is a need to increase their innovation performance and competitiveness. The argument that recasts the EU as lagging behind its global competitors is a recurrent theme for justifying the need for a new European approach to digital technologies in education (Salajan, 2019).

Digital transformation also implies a redefined role for teachers, whose digital competences are seen as requiring an update: "Key players, in particular teachers and trainers, should be better equipped and trained to participate more effectively in the digital transformation of education and understand the opportunities this can bring, when used effectively" (EC, 2020c, p. 10). The Covid-19 crisis is again perceived by the Commission as an opportunity for teachers, because they can organise their teaching differently and interact with students on a personalised basis. The Commission suggests that digital competences "should be embedded in all areas of teacher professional development, including initial teacher education" (EC, 2020c, p. 9). Similar to the previous category examined, professional development is linked to teacher evaluation through the development of an online self-assessment tool, a "SELFIE for teachers", and a "European Framework for Digital Competence of Educators" (EC, 2020c, p. 12).

Education recovery as sustainable development

Across all of the examined documents, the words "green" and "sustainable" appeared consistently among the most frequently used words. "Green" appears often next to the adjective "digital" to characterise the twin transitions that "hold the key to Europe's future resilience and prosperity" (EC, 2020a, p. 9). In order to achieve the twin transitions, "the Commission recommends prioritising actions to help people acquire knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society and economy" (EC, 2020a, p. 18). Similar to the previous categories examined, striving for sustainable development implies that education should foster the acquisition of relevant skills and competences. To this end, the Commission utilises substantial funds connected to the European Green Deal initiative and the Sustainable Development Goals and commits itself to launching a Council Recommendation on education for environmental sustainability in 2021 (EC, 2020a).

Already with previous Council Conclusions (e.g., European Council, 2010), the EU declared its intention to prioritise education for sustainable development, placing it under the lifelong learning perspective and connecting it to the objectives of economic growth, social cohesion and environmental protection. In light of the Covid-19 pandemic, the Commission utilises the urgency of the situation to reiterate its intentions to integrate the green transition and sustainability into school, higher education and VET (EC, 2020a, 2020d). "Greening the VET sector requires first and foremost a greening of the VET programmes, curricula and content, but also managing the VET institutions with due attention paid to environmental footprint" (EC, 2020d, p. 15). In effect, "greening" implies the integration of relevant skills and content in educational programmes, which can be monitored with the development of yet another European competence framework, this time "on education for climate change, environmental issues, clean energy transition and sustainable development, which will spell out the different levels of green competence" (EC, 2020b, p. 13).

It is interesting to note that the Commission links education for sustainability to entrepreneurship and innovation (EC, 2020a, 2020b), promoting them both as economic and social phenomena. In this regard, a central role can be claimed by higher education institutions: "education, research, innovation and service to society, playing a key role in driving the Covid-19 recovery and sustainable development in Europe while helping education, research and the labour market to benefit from talent flows" (EC, 2020a, p. 11). The European Universities Initiative and the Horizon Europe funding scheme are some of

the EU's instruments employed to promote innovation for sustainable development. Another policy measure that communicates the Commission's social responsibility approach to sustainability is "greener mobility". This implies that programmes such as Erasmus should foster greener and more digital mobility, while physical mobility travel needs to be "carbon-friendly" (EC, 2020a, p. 19).

Discussion and Conclusion

This article has examined the discourses underpinning the EU's education policy response to the Covid-19 pandemic. Its findings revealed three emerging discourses related to education recovery: "upskilling and reskilling", "digital transformation" and "sustainable development". These discourses will now be discussed in the light of the study's objectives and our conceptual framework.

The Covid-19 pandemic offers a unique opportunity to evaluate the ability of organisations to respond to unforeseen crises. In an attempt to respond to the pandemic crisis, the EU has enacted the specific narrative of "education recovery" taking into account the needs of the member states. This kind of response brings with it a certain responsibility, so that we could argue with Ortmann (2010) that the EU's education response means more than merely reacting to the crisis; it involves answering the concerns of the member states and taking action, mainly through generous funding schemes and supportive initiatives. Considering the limited competence of the EU on education matters, an effort to orient the recovery discourse towards employment and economic priorities becomes evident. This is not surprising considering that the EU's interest in education originates from pressures of the employment policy area (Gornitzka, 2005; Halász, 2013). The EC's focus on employability responds to the need to find the right entry points that would allow consensus building among member states and engage not only Ministers of Education in the process, but also Ministers of Finance, who would essentially provide the funding. Consensus and engagement on these issues is easier, if only because youth unemployment is endemically high in the EU, a process that nonetheless undermines the political and social perception of the education sector. The envisaged integration of education and training in the European Semester further illuminates the trend of shifting educational priorities towards sectors other than education, where the EU has greater competence to monitor and influence change.

The proposed initiatives to deal with the crisis seem to recycle old ideas that are used to propose reforms in education inspired by technological solutionism (Grek & Landri, 2021). Although the pandemic is widely recognised as

a window of opportunity for radical changes, it is mainly used as an accelerator to bring forward existing policy agendas characterised by the datafication of education (Brady & Bates, 2016; Grek et al., 2009), the digitisation of education policy (Grek & Landri, 2021; Salajan, 2019) and the idea that education should prepare a flexible up-to-date workforce (Panitsides & Anastasiadou, 2015). Within this context, however, we can also notice an effort to support and promote the social dimension of education. Over the last ten years, we have seen a lot of balancing acts between neoliberal and very much interventionist approaches with high budgets, especially from the European Social Fund in education, as well as several compensatory and corrective social measures. This is also the case with the Covid-19 pandemic, whereby the EU has utilised significant funds, including the Next Generation EU, to help member states recover. The focus on promoting the European Pillar of Social Rights and its first principle on education is also manifested across the examined policy discourses. It is a common objective of all policy texts that recovery should ensure social fairness and inclusiveness, yet always be linked to employment priorities. As such, the idea of investing in people is predominantly conceptualised as a growth and competitiveness factor, and secondarily as a key instrument for social inclusion.

A deep and dramatic crisis such as the Covid-19 pandemic should trigger organisational change, and this includes the necessity to enact not only new actions but also a new axiological framework from which new logics, values and actions derive (Francesconi et al., 2021). Instead of finding or creating new answers to educational issues, old topics have been reinvigorated in the context of Covid-19. For this reason, it seems to be not completely reasonable and perhaps even dangerous to leave untouched the (ethical) logics and framework from which the EU policies derive. The lessons to be learnt from a radical systemic crisis like this one should be themselves radical and systemic. In such hard times, there is no space for superficial or short-term organisational learning. Such learning capacity must be necessarily intended in a broad, deep and holistic sense to include fundamental human and ecological values and a strong axiological framework, which always plays a vital role in an organisation's response-ability. In this way, the European space of education could play a crucial role in relaunching the European political project towards the idea of a new "Social Europe".

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Educational Policies During the Lockdown: Measures in Spain after Covid-19

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The pandemic has disrupted students' lives, learning, and well-being worldwide and exacerbated existing disparities in education. Countries have unevenly followed policy recommendations to ensure education by non-governmental agencies, and in some cases, political and economic ideology has directly influenced the decisions taken, Spain being a case in point. The instructions and regulations published in April 2020 in Spain are analysed and compared in order to regulate the end of the school year, its evaluation, and the start of the new year, given the situation of suspension of classes during and the confinement of the Spanish population decreed due to the Covid-19 pandemic. The 20 documents published by the Autonomous Communities of Spain are subjected to critical discourse analysis. Their approaches and the aspects they highlight or ignore are examined to identify the different models of education that each region defends in times of crisis. There are significant differences between conservative and progressive regions, the latter being more inclined to implement the recommendations of non-governmental organisations.

Keywords: educational policy, Covid-19, evaluation, curriculum, social justice

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Izobraževalne politike med zaprtjem: ukrepi v Španiji po covidu-19

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Pandemija je po vsem svetu prekinila življenje, učenje in dobro počutje učencev ter povečala obstoječe razlike v izobraževanju. Države niso enako upoštevale priporočil nevladnih agencij glede izvajanja politik za zagotavljanje izobraževanja, v nekaterih primerih pa je politična in gospodarska ideologija neposredno vplivala na sprejete odločitve, kar velja za Španijo. Analizirali in primerjali smo navodila in predpise, objavljene aprila 2020, v Španiji, ki urejajo konec šolskega leta, njegovo evalvacijo in začetek novega šolskega leta glede na razmere prekinitve pouka med zaprtjem španskega prebivalstva zaradi pandemije covida-19. S kritično analizo diskurza smo preučili dvajset dokumentov, ki so jih objavile španske avtonomne skupnosti. Preučeni so pristopi in vidiki, ki jih poudarjajo ali zanemarjajo, da bi tako prepoznali različne modele izobraževanja, ki jih zagovarjajo različne španske regije v času krize. Med konservativnimi in naprednimi regijami so velike razlike, pri čemer so zadnje bolj naklonjene izvajanju priporočil nevladnih organizacij.

Ključne besede: izobraževalne politike, covid-19, evalvacija, kurikulum, socialna pravičnost

Introduction

The Covid-19 pandemic has triggered a global crisis that has significantly impacted educational systems (Chen et al., 2020; Geldsetzer, 2020). Since March 2020, most countries have implemented rigorous measures of social confinement or distancing to protect the population from the greatest pandemic of the contemporary era. According to the United Nations International Children's Emergency Fund (UNICEF) data (2020), students and pupils in more than 194 countries stopped attending their schools, meaning that approximately 1500 million children, adolescents, and young adults globally were directly affected by the sudden closure of schools and universities.

Globally, the current pandemic has disrupted children and young people's lives, learning, and well-being and exacerbated the already existing disparities in education. According to a United Nations (UN) statement (2020), the pandemic is expected to reverse the gains of the last two decades of equality directly, particularly in girls' and women's education. In addition, projections indicate that almost 24 million students from primary school to university could abandon their studies due to the health crisis's economic impact.

Faced with this tragic scenario, non-governmental organisations (UN, 2020; United Nations Educational, Scientific and Cultural Organization (UNESCO), 2020; World Bank, 2020) have launched awareness campaigns to motivate countries to implement new policies capable of dealing with the expected consequences. First, recommending that governments, once they have controlled the local transmission of Covid-19, focus on reopening schools in a safe manner, consulting and taking into account all the actors involved. Second, requesting the prioritisation of education in budgetary decisions. At this point, the UN (2020) noted that even before the pandemic, low- and middle-income countries had a $1.5 trillion annual deficit in the education sector. Third, governments should encourage education initiatives that target those at high risk of being left behind (people in emergency situations, minority groups, displaced persons, and people with disabilities). Finally, governments leap into progressive systems that see education as a means to achieve the Sustainable Development Goals.

Countries have followed the policy recommendations' implementation to a greater or lesser extent (UNICEF, 2020). According to Delgado et al. (2020), the determining factors were the number of resources available to each nation and the forms of educational administration that prevailed. Thus, political and economic ideology directly impacted the decisions made in each region. Here, more progressive administrations were more likely to make the recommended changes than more conservative administrations.

While there is a gap in publications describing how educational policies against Covid-19 were developed globally, published experiences explain the situation. For example, Reimers and Schleicher (2020) surveyed professionals and experts from 98 countries on nations' emerging responses to the pandemic. According to the survey results, in the vast majority of nations, 'there is a government directive that establishes the suppression of face-to-face educational activity' (p. 20). When asked what the government or administrations have done to support students' continuous academic instruction, a significant percentage indicates 'nothing'. However, this choice was followed by encouraging schools to use online resources, which have resulted in the distribution of educational materials in some countries (Argentina, Chile, Mexico, Spain, The Netherlands, Germany, Finland, France, Japan, among others).

However, despite the perceptions of the population surveyed, there are proposals for laws and public policies generated in most countries (Gortazar, 2020). On this point, Reimers and Schleicher (2020) specify that the nations have made an effort to generate recommendations to guide the educational processes. Nevertheless, a general review of some of the proposals (Díez-Gutiérrez & Gajardo, 2020) shows that emphasis has solely been placed on generating regulations or recommendations regarding the forms of student qualification and approval during and after the pandemic. Here, the discussion has focused exclusively on the need (or not) to give grades during the pandemic period or if students who do not respond well to educational processes during the pandemic should be approved (Trujillo, 2020).

As a result of this lack – and in the search for a more in-depth analysis of the regulations decreed – we set out to analyse the regulations decreed in Spain during the onset of the covid-19 pandemic. Our objective focuses on the analysis of the ideological and political discourse behind the educational ordinances decreed in the Autonomous Communities, on how the school year should end, how education and evaluation should be carried out during the crisis, and how a new school year should begin in a context of uncertainty.

Spanish educational context

The Spanish Educational System is regulated by the Organic Law of Education (LOE), with modifications included in the Organic Law for the Improvement of Educational Quality (LOMCE). It is structured in general education: infant education, primary education, compulsory secondary education, high school, and professional training.

Infant education covers from three to six years of age. At this time,

children are incorporated into compulsory education. However, it is voluntary, and its purpose is to contribute to children's physical, emotional, social, and intellectual development.

Primary education is compulsory and free of charge. It comprises six school years (courses) that make up a gradual progression in the teaching-learning process, usually carried out between the ages of six and twelve. Its purpose is to provide all children with a common education that acquires basic cultural elements: Spanish history, calculus, arithmetic, communication in Spanish and foreign languages, elementary sciences, civics and democracy, teamwork, abstract thinking, and similar.

The Obligatory Secondary Education stage (ESO) comprises four school years (courses), which are usually followed between the ages of twelve and sixteen. It is organised into subjects and consists of two cycles; the first comprises three school years and one for the second. The second cycle (also known as the fourth course) has a fundamentally propaedeutic character – one can choose between academic teachings to initiate baccalaureate or applied teachings for the initiation to the Professional Formation/University (which are not obligatory).

According to data from EDUCABase (2020), compulsory education in Spain is mainly conducted in person. In 2019, more than 8 million people were enrolled: 63% were studying at public institutions, and 37% were at private institutions. For all of these, the education and curriculum laws are determined by the state; although, their administration and application depend on the administrative units of each territorial unit, which in this case are called Autonomous Communities.

Spain has 17 Autonomous Communities, which, according to their territorial extension, have differing population levels. For example, Andalusia is the most populated, with nearly 8 million inhabitants, while La Rioja is the least populated, with approximately 300,000 inhabitants. Each Autonomous Community is run by an administration elected by popular vote; thus, the type of administration depends on the orientation of the governing political parties.

Currently, there is political polarisation in the forms of governing, since the orientations of the political parties arise from a historical tradition marked by power struggles between those (with a more traditional and religious-political ideology) who defend the monarchical tradition and those (recognised for their progressiveness) who prefer the republican forms of government.

The differences between the two political conceptions currently in power in Spain are complex and stem from a long-standing historical heritage. Conservatives have taken advantage of the last years of constant austerity and

economic recession to defend neoliberal, nationalist, individualistic, privatising positions with a strong meritocratic symbolism that have gained many followers in those Autonomous Communities with greater inequality in income distribution (Andalusia or Madrid). While progressives, who currently enjoy greater sympathy in less unequal regions (Catalonia or Valencia), are closer to a more austere, cooperation-oriented, secular stance that defends public ideals and the common good (Díez-Gutiérrez & Guamán, 2013).

This polarisation has been shown in the Spanish political system since the 19th century (Enguita, 2008), which had its most evident educational expression in the division between public and private schools: the private school is dedicated to the conservative elite, while the public school is dedicated to the popular sectors.

During the 20th century, a short republican parenthesis strengthened the public school, having the universality of education as its main objective. However, this objective was truncated by the military dictatorship of 1939, which prolonged the polarisation of the school until the promulgation of the General Law of Education in 1970. The first socialist legislature (1982-1986) appealed to a weakened public education and favoured an effective universality of education. Since that period, significant changes have taken place in private and public education. The private sector has undergone a certain process of state regularisation (Enguita, 2008): subjection to the standards of the Constitution, the laws and educational reforms; conditioning the state subsidy to a set of requirements comparable to those of the public school (imposing the implementation of the national curriculum, for example); greater weight of teachers and parents in its management and the development of a growing sector of non-religious centres of different profiles (elitist, liberal, renewal, etc.). For its part, public schools have experienced a particular deterioration process: stagnant processes of improvement in teachers' working conditions, growing inefficiency in school organisation and the mechanisms of participation and generalised discrediting of private schools.

At present, by maintaining a specific social order, the conservative political parties that have come to power tended to legitimise free competition in education. However, a more significant number of progressive political parties in power currently seek to establish policies that benefit the legitimacy of universal public school and, at the same time, fight the culture already in place (Díez-Gutiérrez & Guamán, 2013).

Education in Spain during the pandemic

In Spain, the total lockdown of the population (excluding those providing essential services: nurses, doctors, farmers, food traders, etc.) was in place from March 14th, 2020, until the end of the 'State of Alarm' decreed by the government in June 2020. The decision was made because the lockdown of people was considered the most effective non-clinical measure to curb the spread of the pandemic (Choe & Choi, 2020; Kim et al., 2020).

The lockdown of the population resulted in the suspension of classes and the closure of educational institutions; however, the government established that 'educational activities would continue whenever possible through remote and virtual methods' (BOE, 2020a; 2020b).

Schools and universities had to improvise within a short time frame, using the tools they had at their disposal (Trujillo, 2020a; Vallespín, 2020). This meant switching from in-person teaching to remote learning (Gewin, 2020; Gonzales-Zamora et al., 2020) without a planned operation and in a very short time frame (Álvarez, 2020; Hodges et al., 2020).

The situation raised different problems that gradually emerged and affected Spanish society in various ways: First, the students and their families, who, confined to their homes, had to replace classroom work with homework and tasks at home, which generated an atmosphere of overworking (CEAPA, 2020). Additionally, the lack of access to internet resources and fast connections for some families and students was compounded by the distribution of telephone cards with data and computers to some students, but this was not enough for all students without internet resources (Torices, 2020).

The situation worsened for many families who lived in overcrowded and substandard housing (Makarov & Lacort, 2020), which did not represent the best environment to encourage the teaching-learning process. This was exacerbated by unemployment or even Covid-19 infection: parents accompanied their children in their homework and school monitoring when they could (Alonso, 2019), but in many cases, they lacked the material conditions, cultural tools, or time and emotional stability to assist the educational process (Díez-Gutiérrez & Gajardo, 2020; Dusi, 2012; Martín, 2019).

Secondly, teachers had to urgently move all of their classroom planning to the online format (Trujillo, 2020a). They were forced to use their personal resources, using applications that were often not meeting the necessary standards (Trujillo, 2020b). In the digital platforms, they tried to replicate a teaching model similar to the face-to-face one (Jorrín, 2020). In this context, those teaching were overwhelmed, having to respond to hundreds of questions

from their students and families while attempting to contact those who had 'disconnected' (Pérez, 2020).

As the lockdown was extended until June 2020, and it became clear that they would not return to the classroom until the next school year, new problems, doubts, and concerns were raised in the educational community. How was the school year going to end? During the lockdown period, would there be any progress when some students did not have access to the necessary resources? Would a school term be evaluated and graded in a situation in which there was no guarantee that all the students would have had the same conditions and opportunities? What would happen to the 'disconnected' students?

Multiple problems and difficulties led the educational community to ask the administrations to provide resources and guidance with instructions on how to approach the educational process in this exceptional situation. To summarise, some of the questions that were asked concerned how to approach educational assistance during the lockdown, how to finish the school year and evaluate it, and how to approach the beginning of the next one.

The Spanish Ministry of Education and Vocational Training (MEFP) met with the Education Councillors of the various Autonomous Communities, where it established a general framework of action to guide the activities of the educational community and schools aimed at completing the 2019/2020 school year and its overall evaluation. The framework was officially published in the Official State Gazette of Spain on Friday, April 24th, Order EFP/365/2020 (BOE, 2020b), adjusting to the end of the school year and making the criteria for evaluation and advancement more flexible.

This coordination meeting was essential, given that in Spain, educational jurisdiction had been transferred and, therefore, most of the legislation fell to the regional administrations. In Spain, a ministry can establish a general framework, but the Autonomous Communities are ultimately responsible for its implementation and adaptation in each region. Therefore, based on this general framework established by the Ministry of Education, each Autonomous Community had to establish regulations and guidelines within its territorial scope, indicating to educational institutions, families, and students the specific guidelines on how to end the school year without in-person instruction, how to evaluate and grade the learning process; decide what criteria to use so that students could be awarded and advance, and how to tackle the start of the new school year in September 2020.

Method

This research aims to make a descriptive analysis of the different regulations, guidelines, and instructions published by the Spanish administrations during the lockdown period, both at the state and regional levels. In addition, the goal is to investigate and examine the approach, the pedagogical and ideological orientations that have been adopted, and the priorities that have been established in educational policy documents to address the process of continuing distance education; educational policies to end the school year; educational policies to evaluate during the lockdown, and educational policies to begin a new school year.

To reach these objectives, we pose the following research questions: What are the administrations' ideological orientations in the published regulations? What do the orientations of each autonomous community agree on, and with what do they disagree?

All legislative documents issued by the central and autonomous powers in Spain during this period have been considered. They correspond to Royal Decrees, instructions, and guidelines from all these Spanish administrations during the lockdown period, from March 14th 2020 to April 30th 2020. Thus, an analysis has been drawn up from 20 documents, one issued by the national government and the other 19 by the regional governments, responsible for education in Spain and are consequently authorised to adopt measures within their sphere of jurisdiction. A total of 369 pages of legislative documents have been examined.

Table 1

Documents selected for analysis

Autonomous Communities	Date	Title
MEFP	22/04/2020	*Order EFP/365/2020*
Andalusia	24/04/2020	*Instruction for April 23rd 2020, regarding educational measures to be adopted in the third quarter of the 2019/2020 school year.*
Aragon	29/04/2020	*Order ECD/357/2020.*
Asturias	27/04/2020	*Resolution of the Counsellor of Education ordering the continuation of procedures for the end of the school year.*
Balearic Islands	16/04/2020	*Resolution of the Minister of Education, University and Research of April 16th 2020, by which the supplementary instructions are approved as extraordinary due to the Covid-19 epidemic*

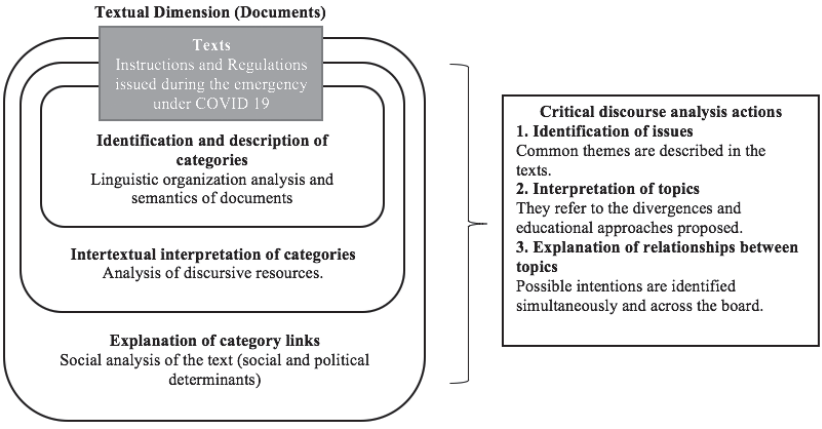
Autonomous Communities	Date	Title
Canary Islands	25/04/2020	*Resolution of the general direction of planning, innovation, and quality, by which instructions are given to complete the school year in the Autonomous Community of the Canary Islands.*
Cantabria	19/04/2020	*Instructions for the third quarter and the end of the school year in infant and primary education for the 2019/20 school year.*
	19/04/2020	
Castile-La Mancha	13/04/2020	*Instructions for the third quarter, final evaluation, promotion, and qualification in secondary education.*
Castile and León	17/04/2020	*Instructions from the Department of Education, Culture and Sports on educational measures for the third quarter of the 2019-2020 academic year.*
Catalonia	30/03/2020	*Criteria for the development of educational activities and the evaluation of students in schools where the second cycle of infant, primary, secondary, high school, and adult education is being taught in order to extend the period of confinement due to Covid-19.*
	20/04/2020	*Instruction for April 17th 2020, regarding educational activity development during the third quarter and the final evaluation of the 2019/20 academic year.*
Extremadura	18/04/2020	*Instructions for the development of educational activities and students' evaluation in the third quarter in centres where education is provided, given the extension of the confinement period due to Covid-19.*
Galicia	17/04/2020	*Instruction no. 4/2020 of the general secretary of education.*
La Rioja	16/04/2020	*Instructions from the General Directorate of Education, Vocational Training and Educational Innovation, for the third quarter development of the 2019/20 academic year, in the Autonomous Community of Galicia*
Madrid	21/04/2020	*La Rioja Distance Education Continuity Plan (26/03/2020). The Regional Minister for Education declares that La Rioja adheres to the agreements of the Ministry of Education (16/04/2020).*
Murcia	20/04/2020	*Resolution of the Deputy Regional Minister of Education Policy issuing instructions for the development of the third quarter and end of the 2019-2020 academic year in the Community of Madrid due to the state of alarm caused by the coronavirus.*
Navarra	22/04/2020	*Instructions from the Ministry of Education and Culture on third-quarter educational measures for the 2019/20 academic year due to the impact of Covid-19 on schools in the region of Murcia.*
Basque Country	22/04/2020	*Instructions on the educational activity, given the suspension of the presential activity in Navarra's educational centres.*
Valencia	03/04/2020	*Final Educational Plan for the School Year 2019-2020.*

We selected Fairclough's critical discourse analysis model to conduct an analysis consistent with the qualitative approaches (Fairclough, 2008). With which: 1) we identify and describe emerging issues and group them into categories to analyse the meanings that are derived from the discourses in the regulations (linguistic analysis); 2) we generate an intertextual interpretation of the selected categories from the discursive resources, highlighting the

representations of the educational models they reflect (intertextual analysis), and 3) we explain how the text is conditioned by the social situation, the institution that has produced it, and the social structure in which it is inscribed, investigating how it contributes to produce or maintain a certain social order (social analysis). In this research, we would like to emphasise that we only present the findings made at level 3, that is, the social and political explanations identified, since these are directly related to the objectives and research questions posed.

Figure 1

Fairclough's Critical Discourse (Analysis developed).



The perspective of critical discourse analysis was selected for its usefulness in the chosen discursive context, given that legislative documents are exponents and expressions of the policies and actions that regulate educational administrations, and as such, are texts that constitute a political discourse (Fairclough, 2008). Thus, the developed critical discourse analysis in this study enabled us to reveal how the administrations' decisions operate and its ideologies. In this case, references are made to the educational and assessment model in an adverse context, such as the one generated by the Covid-19 pandemic.

The critical discourse analysis in this research focused on the analysis of four categories, which are grouped into topics addressing decisions made at the end of one school year and the beginning of the next, in the context of a pandemic: (a) development of the teaching-learning process during the third term; (b) end of the third term and the school year; (c) assessment of the third term and the entire school year 19/20; (d) beginning of the school year 20/21.

Results

Some of the key aspects of the analysis are presented, taking into account the current topical understanding and further analysis of ideological and discursive relationships.

Educational policies to address the continuing remote education process

Due to the pandemic, all Autonomous Communities consider the lockdown period an 'extraordinary situation'. They believe that the continuation of the remote education process requires 'extraordinary measures', given the anomaly of the absence of face-to-face classes during this period, sharing the philosophy of being sympathetic to the difficulties that a significant number of students have to face to continue with remote learning.

The use of the adjective 'extraordinary' in documents is generally accompanied by the noun 'need' while the noun 'law' is always accompanied by the adjective 'urgent'. This semantic relationship indicates a contextual background similar in all documents: socially, it is important to address a problem that had not been addressed, which should be done as quickly as possible. This discourse, shared by all the administrations, is intended to offer comfort in the face of a generalised clamour from the educational communities amid the Spanish confinement. After all, many of the documents were published a month after the state of alarm declaration. That is, for a span of two weeks to a month, the population had to wait to find out what would happen with the educational processes while Spain joins the top five countries with the most deaths and hospitalisations and its inhabitants had to cope with one of the most restricted confinements in Europe.

The above context, however, motivates a common policy that shares these expressions: 'to take care of people', 'giving priority to their integral well-being over purely curricular aspects, taking into consideration the exceptionality of the state of alarm', giving extreme importance to complying with the rights included in the UN Convention on the Rights of the Child; to develop activities that help students to 'keep themselves incorporated into continuous learning and to encourage their interest in learning'; with 'specific plans for recovering the school link and reinforcing it' aimed at 'disconnected or unreachable students'; 'adapting the tutorial model to the new situation, with the aim of helping students to organise their school activities, self-regulate their learning, and maintain a good emotional state [...] and academic and

professional orientation'; 'attention to students with special educational needs'.

As shown in the selected excerpts, the regulations generally avoid the discourses of social exclusion based on what is outlined in international agreements. This intertextual resource is evident in all the proposals, so it can be indicated that extreme care was taken at the time of designing the laws, not to generate confusion between the country›s internal indications and the international agreements signed. This point is essential since, formally, people are already being deprived of their right to free movement, so the loss of other rights, such as access to education, might lead to a much greater social crisis.

In a different line, all the Autonomous Communities share the need to 'make the curriculum and educational programs more flexible', focusing on 'the teaching activities of the previous term on the essential learning and skills that students should develop, according to their stage, course, area, or subject, renouncing an exhaustive fulfilment of the initial purposes, making their work plans more flexible and taking care not to penalise or harm the welfare of their students or overload them with excessive tasks'.

However, the autonomous communities are beginning to differ in the importance (or not) of continuing to work on curricular content during the last trimester. Some (Andalusia, Castile and León, Extremadura, Galicia, Madrid) placed more emphasis on 'advancing in content planned for the third term', clarifying some that 'when possible' (Andalusia), others in Secondary, especially in 4th of ESO and 2nd years of baccalaureate, courses that lead to a degree (Asturias, Cantabria, Castile and León), or, as the Communities of Murcia and Extremadura that assign responsibility for advancing to the teaching teams: 'advance of new content that the teaching team has considered essential' (Murcia) or 'The faculty, as the maximum responsible for the curricular implementation, shall, through the pedagogical coordination committee or body that assumes its functions, reduce and condense as much as possible the curriculum to be developed in the third term, without pressure to have to finish the curriculum or programs, whose exhaustive fulfilment must logically be renounced, but also without detriment to a minimum educational quality and sufficient treatment of those learning contents and skills that are essential, depending on the stage, course, area, or subject, especially in the final courses leading to a degree' (Extremadura).

However, others (Aragon, Asturias, Balearic Islands, Canary Islands, Cantabria, Catalonia, Navarra, Basque Country, Valencia) establish that 'during the third term, in general, no progress should be made on new content'. They advocate more for 'reviewing', 'reinforcing', and 'consolidating' the 'learning done in the first two terms of the course, seeking to encourage work routines,

study habits: The reinforcement, review and deepening of what has already been worked on in the first two terms will be the priority activities' (Canary Islands).

Although, some Autonomous Communities, of one or another tendency, also introduce the possibility of 'if necessary, extending the previous learning that is necessary for all or part of their students' (Navarra, Galicia) or 'selecting exclusively the material that is considered most relevant' of the educational programs (Valencia).

The political polarisation of the discourses begins to be evident when the curricular indications are exposed. In general, the discourses on the curriculum in the documents analysed tend towards two alternatives: continuing with the proposed curricular objectives (common discourse of the autonomous communities led by conservatives) and not continuing and focusing on reinforcing what has already been taught and learned (which is evident in those communities led by progressives). There are no proposals that imply a curricular change beyond what is already imposed, and this means that the logic of urgency indicated in the previous semantic analysis does not present changes to an imperative logic of the curriculum.

At this point, when carrying out a social-linguistic analysis, we find a phenomenon that Fairclough (2008) calls 'discursive colonisation', Which corresponds to the construction of common meanings from the logic of power and sustains certain practices over other possible alternatives. The logic of change and adaptation of the curriculum in a context of crisis always revolves around the application to a greater or lesser extent of what already exists and is obligatory. It never focuses on the creation of new alternatives, new ways of making the curriculum.

Educational policies for ending the school year

Although some Autonomous Communities defended the opening of educational institutions before the end of the 2019/2020 school year, as was done in other countries such as France, the Central Administration finally established that classes would not resume until September in general, with the start of the next school year. After that, however, the schools would be opened in mid-May for disinfection, preparation, administrative work, and teachers and auxiliary staff. Moreover, at the end of May, they would be opened for minors whose parents had to work outside the home, students in courses that required a degree, but voluntarily, and in groups of 15 at most, as well as students in need of educational reinforcement.

Practically all the Autonomous Communities agreed on establishing the end of the school year in June, as has been the custom throughout the school year. The only exceptions were some unique processes such as university entrance exams or access to vocational training courses.

There was also consensus among the Autonomous Communities regarding the summer period, in which, for the most part, the following was established 'the carrying out of reinforcement activities in the summer period (such as individual classes, one-on-one tutoring or homework assignments), in diverse forms and combined with recreational activities (such as sports workshops, art workshops or summer camps)' (MEFP). Although few reflected this in the guidelines analysed; however, some Autonomous Communities such as Murcia were different from this general approach, focusing these reinforcement programs during the summer period with a more school-based nature, with the aim of 'reinforcing those contents that may have been affected by the non-attendance educational activity'. Basque Country, in this sense, limited itself to 'advising' that 'reinforcement or recovery tasks be assigned during the summer vacations'.

In analysing these laws, we observe that the proposals tend to maintain certain practices (such as reinforcement activities) focused on maintaining an imperative curriculum discourse developed before the pandemic in the Organic Law on Education. In the context of political polarisation, maintaining the completion of the course in schools in June and the beginning of the new course in September is approached from diverse discursive meanings: the autonomous communities led by 'conservatives' expose, as we saw before, a discourse far from the spirit of reform, the linguistic marks of this attitude are exposed in phrases such as 'it will maintain the characteristics proposed by the legislation' or 'it will maintain what is exposed in Article 3 of the Organic Law [...] during the third quarter of the 2019-2020 school year, independently of the suspension of educational activity' in the speeches of the texts of Castile and León, Madrid, and Andalusia. In these texts, the constant presence of the verb 'to maintain', a linguistic mark present at least three times in each document, is striking. On the other hand, more profound indications on how to deal with this indication are lacking.

As for the autonomous communities led by 'progressives', the discourse is closer to reform, although, like the conservative indications, there are still some linguistic barriers oriented to the fulfilment of the law. However, the texts usually include more detailed indications about the new way of operating the closing of the course and the beginning of the new one in schools, giving more prominence to the educational teams of the centres: 'The management team

of each centre will design a work plan until the end of the course, which will include the elaboration of individual reports to evaluate the students, and the reinforcement and recovery plans' (Asturias).

An excellent example of the above can be seen in the community of Navarra, which reveals a change in the plan imposed by the law from a discursive spirit oriented to the reform: 'During the course, plans for the recovery and adaptation of education will be organised [...] these plans will be based on the individualised reports that will be issued at the end of this course by the educational institutions'. Here, the conceptual individualisation of the learning subjects is transformed into a discursive norm with five mentions in the instruction, that is, a high semantic load that weeks the importance of individualising the processes of closing courses and beginning a new one.

Educational policies to evaluate during the lockdown

Perhaps this dimension is the most divergent regarding proposing the appropriate measures in the different Autonomous Communities guidelines.

In principle, in the block of agreements, it is noted that all the guidelines ensure the evaluation must be 'continuous, formative, and integrative' and that the teaching team must ultimately take the decision on promotion and qualification.

All the Autonomous Communities also declare that it is necessary to 'relax' the criteria of the current education law, the LOMCE, which establishes that it is possible to pass from one course to another with two failed subjects (up to three, exceptionally), if they are not Mathematics and Language (although even for this there are exceptions, depending on the final decision of the teaching team). In addition, the law establishes that to obtain the title of ESO or baccalaureate, all the subjects must be approved. However, the Community of Madrid developed the law to allow students to advance to the next course with up to five failed subjects (Gutiérrez, 2016).

What is understood in each case by 'flexibility' is what confronts the positions of the different Autonomous Communities, some of which are more aligned with what could be called the 'hard' or 'closed' position (centred on the number of failed subjects that should be allowed to advance or to be held back) and the 'comprehensive' or 'open' position (centred on an approach of 'general promotion' of the entire student body and that 'the degree should be the usual practice for students in the 4th year of ESO and 2nd year of baccalaureate').

Another of the discrepancies is at the time of grading. Some bet on considering only the grades obtained in the first two terms of attendance, where teaching and learning were developed regularly. Others opt for grading with

new grades during the crisis, integrating ones that could be negative in the records of students with greater problems.

The third focus of the split is repetition. Although all the Autonomous Communities declared that course repetition should be an 'exceptional' measure, as it is in the current education law, even though it is too frequent in Spain, they did not coincide with making this 'exceptionality' a reality. Furthermore, it was added that the teaching teams would need the authorisation of the government to make a student repeat a course

Another controversial issue is that each student must have a personalised report detailing the difficulties they encountered so that their teachers can be aware of these in the following year. These reports are made every year, but they do not include, as they do now, personalised and comprehensive information for each student. Although their purpose is to facilitate the student›s transition to other grades and prepare the necessary support or reinforcement, if required, the guidelines do not seem to consider the effort and time required by them.

When performing linguistic and semantic analyses of the texts in their sections on evaluation in a pandemic context exposed, they are deictic[3] (e.g., that, this), accompanied by phrases such as 'various forms to evaluate' and explicit clarifications such as 'it will encourage a continuous evaluation, diagnostic, formative, and integrative in all stages, cycles, and teachings' (Navarra). Thus, this reveals a plurality of discourses in conflict with the traditional forms of evaluation (single-selection exams, for example) that, during the last decades, have been strongly questioned in the face of assessing a more progressive, formative and qualitative evaluation approach. At this point, the law becomes an agent that motivates change.

However, there are sharp discrepancies on the importance of the mark as the only way to promote (move from one course to another) students. For example, in Autonomous Communities that are more conservative, marking with grades has more value than the report, while the more progressive communities value the report more. Furthermore, it is observed that discursively, those identified as conservative tend to be more akin to concepts related to learning quantification, and those with more progressive discourses tend to have more affinity for the qualitative evaluation of learning.

Educational policies to start the new school year

This aspect is the least developed in the guidelines and regulations issued by all educational administrations. Nevertheless, it appears, in one form or another, in all of them.

Practically, in all of the regulations analysed, the majority agreement is the organisation of different programs or activities to recover and adapt the curriculum for the beginning of the new school year. These plans must be based on the individual reports made in the evaluation of the previous school year to adapt them to the students' needs 'with the aim of acquiring the basic competencies that have not been achieved in the present school year' (Galicia).

Some Autonomous Communities define or specify more precisely the process of starting the school year, with direct aid 'for the provision of resources for educational inclusion and combating dropout' to assist students with significant learning difficulties by intensifying reinforcement activities (Valencia). Moreover, in these specific Autonomous Communities, schools must focus 'their action plan for enhancement (PAM) in the design and organisation of consolidation activities and recovery of learning that is essential for students to successfully continue in the coming year' and establish a measure, to a degree of extent novel, which consists in the fact that 'the students of 1st ESO work by areas' organised in a curricular way 'similar to the existing (PMAR) of 3rd ESO and in the reinforcement programs of 4th ESO (PR4), which group most of the knowledge subjects: linguistic and social, scientific, mathematical and technological'. Although the Autonomous Community of Aragon also points out, in this sense, that it proposes to make a general schedule by cycles, authorising 'an exceptional curricular organisation'.

Discussion

The educational policies proposed by the Ministry of Education in Spain to end the 2019/20 school year, marked by the coronavirus pandemic and stay at home orders, and to begin the next 2020/21 school year, were presented on April 15th, 2020, at the Education Sector Conference. However, the agreements reached at that meeting with the Education Councillors of the various Autonomous Communities and subsequently embodied in Order EFP/365/2020, of April 22nd, began to be challenged very soon by some regional education officials.

Five Autonomous Communities (Madrid, Andalusia, Castile and León, Murcia, and Basque Country) disassociated themselves from the agreement initially reached after a week. The analysis of the guidelines issued by the different Autonomous Communities indicates that the discrepancies between these regions have more to do with ideological biases and political confrontations than with educational or pedagogical approaches. This is the view of the representatives of the public school system›s families, who stated that behind the dropout

and the confrontation with the government, what 'was hidden was a political struggle' (Torres & Zafra, 2020).

These Autonomous Communities that have been more clearly demarcated are led by conservative governments, some even with the support of neoliberal and ultra-right-wing political groups, while a progressive coalition leads the state government. The 'conservative' communities publicly claimed that they did not support the 'general approval', although it was not included, as such, in the agreement. They claimed that they were concerned that students would be promoted to the next course or be promoted to high school with failed subjects, although this is already the case with the current education legislation.

They also questioned the possible territorial difference between communities regarding the requirement to pass a course or the demotivation of students to make an effort if they knew that what they did during the third term would not be evaluated (Sánchez et al., 2020). Madrid and Murcia, which are governed by the harshest conservative sector, demanded that the ministry set the number of failed subjects that can be promoted and the number of students who can advance so that there would be no difference between communities: 'There may be communities where our children pass the school year with five failed subjects, and others, such as Madrid, where they will not pass with failed subjects' (Sánchez, 2020).

As we have seen in the results, behind the different approaches to education policy that appear in the Autonomous Communities' guidelines and the inevitable clash or confrontation of the block of conservative regional governments with the more progressive state government, there are substantial pedagogical questions that affect education policy. Questions such as what importance is given to a school year amid a global pandemic; whether learning about school content is a priority in this situation of extraordinary exceptionality; whether it would be severe if students 'lost' a year; or whether it would affect them in the immediate future to advance without having studied a term. At the same time, it can also lead us to ask ourselves if we can afford to leave children and adolescents with hardly any educational stimuli for three months. Plus, another three months of vacation and how harmful this can be for students from more disadvantaged backgrounds, who are usually those who can most benefit from the compensatory effect of the school in the face of deprived family situations (Sánchez & Rodríguez, 2020).

Conclusions

The analysis of the guidelines of the Autonomous Communities, based on the results described above, allows us to affirm that the different variants of the regulations could be framed within a range between two major approaches, where each Autonomous Community positions itself towards one side or the other according to its orientation and political and ideological affinity, which is logically reflected in its educational policy.

The progressive vision and the conservative vision in Spanish education laws demonstrate a confrontation between opposing camps: 1) curricular flexibility versus an inflexible curriculum; 2) an evaluation centred on the assessment of difficulties versus an evaluation that verifies the learning acquired; 3) the promotion of all students from one year to the next versus promotion based on the number of marks and the number of failed subjects.

To summarise, one is an approach that conceives education as a global development of the person, taking into account the vital and emotional situation of the students, their families, and the teaching staff in this exceptional time, while the other revolves almost exclusively around progress in the curriculum and contents and their evaluation. Emphasising individual effort acquiring a specific corrective character over those who do not achieve the expected results, even in these circumstances.

In this approach, which could be called more 'progressive', the Autonomous Communities of Aragon, Asturias, the Balearic Islands, Catalonia, and the Community of Valencia are certainly included. A more focused approach fundamentally in settling the essential and relevant lessons, 'avoiding the need and pressure to finish the curriculum' with tutorial follow-up, emotional support, and a formative evaluation tailored to the formative and personal limitations of each student, establishing that the assignments and activities completed remotely in the third evaluation should be esteemed only for 'added value', because this remote period was considered 'not teaching or qualifying'. Therefore, in their guidelines and regulations, they joined the central government's proposal that advocated 'evaluating the student in their entirety, in their capacity to develop as a human being'.

The perspective, which we can call more 'conservative', is mainly led by the Communities of Andalusia, Galicia, Madrid, and Murcia. This perspective focuses much more on continuing to advance content, choosing to address the situation by adapting the 'established temporality' and 'telematic mechanisms' to 'guarantee the continuity of the teaching-learning processes'. As for evaluation, although it is recalled that this must be continuous, formative,

and integrative, promote measures that do not penalise students by making the regulations more flexible, as is the case with the rest of the Autonomous Communities. However, the reality is that they establish the third school term as evaluable and gradable and not to pass from one year to the next or from a certain number of failed subjects. This shows that they link evaluation above all with grading, where it seems that 'passing still has more weight than learning' (Zubillaga & Gortazar, 2020).

The rest of the autonomous communities (Canarias, Cantabria, Castile and León, Castile-La Mancha, Extremadura, La Rioja, Navarra, and Basque Country) are distributed positioned between these two positions, with guidelines tending more towards one approach or the other.

Nevertheless, as we have shown, there are a series of proposals and measures that are shared by the majority of the educational administrations – both the government and the Autonomous Communities – and which should be highlighted since they have generated a pedagogical consensus that is positive for future educational policies in this country. Specifically, these policies will: promote discourse on 'Leave no one behind' as an ultimate approach to all educational policy proposals; make the teaching methodology and grading system more flexible during a period of crisis, taking into account the exceptional nature of the situation; motivate a discourse of trust with education professionals; assume a discourse that is attentive to the care and welfare of children as an essential reference for the educational work.

The strength of this study is the novelty of the proposal and the type of analysis developed. However, it also has weaknesses, which include the specificity of its study context.

With this study, we seek to motivate new, more in-depth, comprehensive, and diverse research on education policy in the times of Covid-19, taking into account the need for new legislative proposals that seek to protect people›s rights, especially children and adolescents.

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Challenge Accepted: Experiences of Turkish Faculty Members at the Time of Emergency Remote Teaching

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The Covid-19 pandemic caught everyone unprepared. Higher education institutions were expected to be the least affected due to their long history of distance education, which has enabled the development of expertise and technical infrastructure, but were they? The present study focuses on faculty members' experiences at the time of emergency remote teaching and afterwards. The survey method was devised to conduct the study. An online questionnaire called the Emergency Remote Teaching Views Questionnaire was developed by the researchers and administered at higher education institutions throughout Turkey. With a combination of convenience and snowball sampling, 351 faculty members from 72 different public and private higher education institutions were reached. The descriptive analysis of the data revealed that almost 62% of the faculty members had never taken any form of training regarding online distance education before the Covid-19 pandemic. Although one fifth of the faculty members indicated that they had had distance education experience three times or more before the pandemic, around 62% of them encountered remote teaching for the first time. Many faculty members indicated that they spent more time on remote teaching than face-to-face teaching; they had trouble following students' development; the students were disinterested in the classes; they had technical problems, but they also received support from their institutions. Although only one fourth of the faculty members reported being unsure about the quality of their remote teaching, three fourths of them believed that it was not as fruitful as face-to-face teaching. This was especially evident in the area of assessment and evaluation. Based on these results, it can be concluded that higher education institutions were caught unprepared, but their adaptation was very quick.

Keywords: emergency remote teaching, higher education, Covid-19 experience, faculty member, distance education

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Sprejet izziv: izkušnje turških akademikov med poučevanjem na daljavo v izrednih razmerah

Faik Özgür Karataş, Sevil Akaygun, Suat Çelik, Mehmet Kokoç in Sevgi Nur Yilmaz

Pandemija covida-19 je vse ujela nepripravljene. Pričakovalo se je, da bodo visokošolske ustanove zaradi dolge zgodovine izobraževanja na daljavo, ki je omogočila razvoj strokovnega znanja in tehnične infrastrukture, najmanj prizadete. Pa je bilo res tako? Ta študija se osredinja na izkušnje akademikov med poučevanjem na daljavo v izrednih razmerah in po njem. Za izvedbo študije je bila zasnovana metoda anketiranja. Raziskovalci so razvili spletni vprašalnik, imenovan Vprašalnik o stališčih o poučevanju na daljavo v izrednih razmerah, ki so ga uporabljali na visokošolskih ustanovah po vsej Turčiji. S kombinacijo naključnega vzorčenja in vzorčenja s snežno kepo je bilo zajetih 351 akademikov iz 72 različnih javnih in zasebnih visokošolskih ustanov. Deskriptivna analiza podatkov je pokazala, da se skoraj 62 % akademikov pred pandemijo covida-19 ni udeležilo nobenega usposabljanja o spletnem poučevanju na daljavo. Čeprav je petina akademikov navedla, da so imeli pred pandemijo trikrat ali večkrat izkušnjo z izobraževanjem na daljavo, se jih je približno 62 % s poučevanjem na daljavo srečalo prvič. Številni akademiki so navedli, da so za poučevanje na daljavo porabili več časa kot za poučevanje na fakulteti, da so imeli težave s spremljanjem razvoja študentov, da so bili študentje nezainteresirani za pouk, da so imeli tehnične težave, a so dobili tudi podporo svojih ustanov. Čeprav je le četrtina akademikov navedla, da niso prepričani o kakovosti svojega poučevanja na daljavo, jih je 75 % menilo, da poučevanje na daljavo ni bilo tako uspešno kot poučevanje na fakulteti. To je bilo še posebej očitno na področju ocenjevanja in evalvacije. Na podlagi teh rezultatov je mogoče sklepati, da visokošolske ustanove niso bile pripravljene, a je bilo njihovo prilagajanje zelo hitro.

Ključne besede: poučevanje na daljavo v izrednih razmerah, visokošolsko izobraževanje, izkušnja s covidom-19, akademiki, izobraževanje na daljavo

Introduction

The year 2020 marked our lives by bringing two main challenges: coping with Covid-19 and adapting to a new lifestyle without sacrificing much from our regular lives. From the perspective of education, the year provided a different experience to millions of students and faculty members all over the world, as most of the classes were carried out online at K-16. Despite the fact that everybody had been using the internet extensively for personal reasons, this mandatory transition was unexpected and therefore challenging.

With the development of internet technologies, there has been a great deal of interest in online education since the 1990s. Accordingly, various concepts, including distance education and computer-assisted learning, have been introduced in the field to express education in the online environment. In a more general sense, even though it is rooted in distance education, online education is considered a hybrid system that combines distance and traditional education (Allen & Seaman, 2011; Hannay & Newvine, 2006). It is similar to traditional education in terms of teacher-facilitated courses with weekly topics and objectives, readings, assignments, discussions, projects and so on, but it is web-based and distributed from a distance by employing a combination of synchronous and asynchronous methods of delivery that are offered anywhere and anytime. Thus, by promoting decentralised and interactive learning environments, online learning differs from the classical distance education model (e.g., TV-, radio- or correspondence-based) (Garrison, 2009; Toporski & Foley, 2004).

Online learning allows educators to adapt instructional design principles by employing a wide range of tools that enable learners to remain engaged over time and space. More specifically, online learning is usually associated with collaborative constructivist approaches by employing web 2.0 tools. These tools convey the potential to connect people and rethink passive pedagogical methods common to higher education. However, it is emphasised that online learning offers the possibility of engaging learners in discourse and collaborative learning activities rather than just bridging distances between educational institutions and learners (Garrison, 2009). Moreover, online learning resources enable learners to create an individualised learning environment in terms of their personal learning needs and preferences (Lebenicnik et al., 2015).

In describing online learning, Neubauer (2002) emphasised creating multiple modalities for instruction and virtual communities that tie members of the class together as well as the school. Other principles of designing an online distance education programme or class should include student engagement

and interactiveness, context-based teaching, low cognitive load, appropriate scaffolding, and self-directed learning.

Starting from December 2019, the Covid-19 outbreak affected the whole world in many aspects, including education (Sahu, 2020). During this period, education was carried out through different channels, including TV broadcasting and the world wide web. In general, online learning has been most widely referred to during the Covid-19 outbreak, as education at various levels was mostly carried out online. At the same time, the new concept of emergency remote teaching (ERT) has emerged, adding to the concepts used in the literature about online education. The main difference that distinguishes ERT from online education, which has been used in educational processes for years, is that ERT is not based on a planned curriculum, whereas online education is based on a planned and programmed teaching design (Hodges et al., 2020; Kyne & Thompson, 2020).

The experience gained during the ERT period is important for understanding the needs of educators and students, so that more effective learning environments can be formed. Specifically, regarding higher education, recently conducted studies have focused on the ERT experiences of undergraduate students (Jeffery & Bauer, 2020; Perets et al., 2020; Petillion & McNeil, 2020; Shim & Lee, 2020; Wilcox & Vignal, 2020), instructors (Holton, 2020; Johnson et al., 2020) or both (Mohmmed et al., 2020).

In these studies, findings have revealed the problems experienced during the ERT process (Holton, 2020; Sandi-Urena, 2020; Shim & Lee, 2020), the effects of the process on students (Jeffery & Bauer, 2020; Petillion & McNeil, 2020), the teaching methods implemented and the tools and applications used in teaching (Gares et al., 2020; Johnson et al., 2020; Perets et al., 2020), the supports needed (Johnson et al., 2020), the factors that prevent learning in the process (Kyne & Thompson, 2020), the difficulties in conducting laboratory courses (Gares, et al., 2020; Sikora et al., 2020), and the gains obtained in the process (Osman, 2020). In the present study, the experiences of university faculty members (FMs) at the time of ERT and afterwards in Turkey were examined to shed light on the quick response to the unexpected school shutdowns.

Research on Emergency Remote Teaching

The emergent nature of remote teaching in a pandemic was such a new situation that it required conducting research as well. There have been several studies examining FMs' experiences and teaching, students' experiences and learning, as well as the settings and infrastructure of ERT. When these studies are reviewed, it is evident that the most common difficulties encountered in the process were

technical problems, including insufficient equipment (Holton, 2020), the low speed of internet connection (Gares, et al., 2020; Sandi-Urena, 2020; Wilcox & Vignal, 2020), disconnections experienced by many students (Kyne & Thompson, 2020), and especially the inability of students living in rural areas to access their course content due to their internet infrastructure (Gares et al., 2020).

Regarding the process of teaching and learning, the main problem emerged in the area of assessment and evaluation (Gares et al., 2020; Osman, 2020; Wilcox & Vignal, 2020). Wilcox and Vignal (2020) reported that the most important factor causing stress for both FMs and students during the ERT process was exams. It has been determined that FMs and students were concerned about the reliability and safety of exams. Osman (2020) also suggested that there were significant difficulties in measuring and evaluating practical skills, technical competencies and skills such as teaching practice. In order to overcome the difficulties in measurement and evaluation, it was recommended to use more flexible measurement tools and methods instead of the traditional measurement tools that have been used to measure recall (Petillion & McNeil, 2020).

In addition, it was determined that many distracting factors in the home environment affected students' performance in learning (Holton, 2020; Kyne & Thompson, 2020; Mohmmed et al., 2020; Petillion & McNeil, 2020). Students expressed the difficulties of working at home because their parents and siblings were also at home during ERT (Kyne & Thompson, 2020). Petillion and McNeil (2020) reported that 84% of students agreed with the view that "distractions caused by their physical environment reduced their ability to participate in online classes and to show their real performances".

The results of the studies indicated that the difficulties experienced during ERT affected learning in many ways. It was observed that students' class participation was reduced (Perets et al., 2020) and communication between student-student and student-instructor, which is one of the important factors affecting learning, was not conducted properly (Holton, 2020; Kyne & Thompson, 2020; Petillion & McNeil, 2020; Wilcox & Vignal, 2020). Jeffery and Bauer (2020) also claimed that the rich interactions between students that are necessary for attendance, participation and learning were lost. On the other hand, it was observed that strong communication established between students and FMs before the pandemic increased the participation of students in courses (Gares et al., 2020).

In terms of the challenges faced regarding course content, courses involving practical skills such as laboratory courses required serious adaptation. Such courses were conducted by utilising both synchronous and asynchronous environments. It was reported that although students found online synchronous

lessons especially useful in maintaining the learning process in a planned way (Petillion & McNeil, 2020; Wilcox & Vignal, 2020), using synchronous and asynchronous environments together was more effective (Sandi-Urena, 2020). Nonetheless, asynchronous environments were also found to be useful, as they enabled students to learn by providing the flexibility to repeat course content whenever they wanted (Schlesselman, 2020). Among the teaching methods used during ERT, students determined that the most effective learning tool that allowed them to focus on learning was homework involving conducting research, and the most inefficient method was the direct instruction method (Perets et al., 2020).

ERT was new but informative for all of us, as it showed us that our experiences can provide insight into how to be more prepared to provide better online education (Kyne & Thompson, 2020; Mohmmed et al., 2020; Osman, 2020). Therefore, research showed that the lessons learned in this period were very important in terms of shedding light on future periods (Holme, 2020; Osman, 2020). However, it seems that more research is needed to reveal the experiences of different stakeholders in education from different educational environments. The present study will contribute to our efforts to understand the ERT experiences of students and FMs by providing a wide range of coverage of different HEIs and various faculties, from education to medicine, and from engineering to arts.

The purpose of this study is therefore to scrutinise university FMs' experiences at the time of ERT and afterwards in Turkey. The research questions that guide this study are:

- What are the ERT experiences of FMs in Turkey?
  - What are the professional development experiences of FMs during ERT?
  - What are the teaching experiences of FMs during ERT?
- What are the perceptions of FMs regarding the support provided during ERT?
- What are the views of FMs regarding online distance education besides ERT?

Method

The present study was designed and conducted in accordance with the survey research design framework, in which people's attitudes, interests and thoughts about a specific subject are investigated (Cohen et al., 2017; Fraenkel & Wallen, 2006). With advances in technology, online questionnaires are becoming

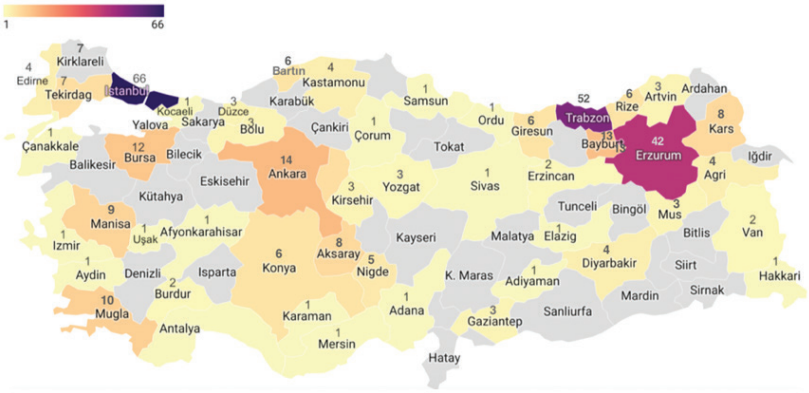
widely employed tools for survey studies. In order to describe the experiences of FMs in Turkey, an online questionnaire was administered by utilising a well-known online (web and mobile) survey tool in the fall term of 2020.

Sample

The sample of the study is composed of FMs who were teaching at HEIs and had to adopt emergency remote teaching in their courses in Turkey. The study was approved by the Institutional Review Board of the first author's university. The link to the online questionnaire and a brief solicitation note asking for their consent were sent to FMs via email or instant messaging applications. The authors' networks were used to create lists of academic staff for solicitation. Each faculty member in the list was also asked to share the link of the questionnaire with their colleagues, if possible. In this way, the sample was created according to the convenience and snowball sampling methods. It is known that the return rates of online surveys are low (Cohen et al., 2017). With the selected sampling methods, the aim was to increase the return rates and to obtain more realistic answers to the questionnaire. A total of 351 FMs working at 72 different HEIs from six different faculties or departments affiliated to these institutions participated in the study. As a result of convenience sampling, there was more participation in the study from the institutions to which the authors are affiliated. As shown in Figure 1, the distribution of the participating institutions is spread across the country, which might be considered as an indicator of country representation

Figure 1

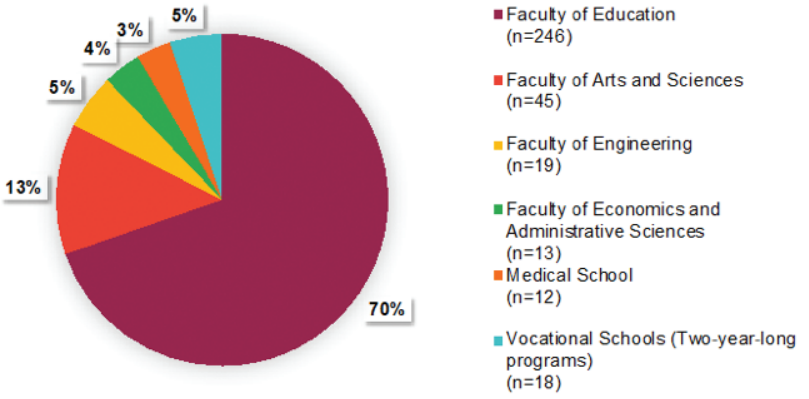
Distribution of the number of FMs according to the cities in which their affiliated HEIs are located



Although the participating FMs were from six different faculties, most of them were working in the faculties of education with which the authors of the present study are affiliated. As seen in Figure 2, the majority of the participants were from faculties of education.

Figure 2

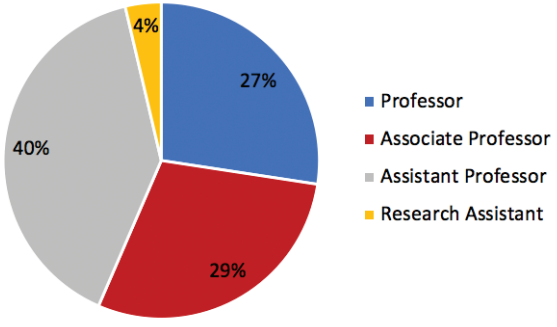
Distribution of the number of FMs according to the faculties or units at which they were working



Regarding the positions of the faculty members, there is a fair distribution, as shown in Figure 3.

Figure 3

Distribution of the FMs by their positions



Data Collection

The data in the study were collected by a questionnaire called the Emergency Remote Teaching Views Questionnaire (ERT-VQ), which consisted of 56 items developed by the researchers. The questionnaire has five sections including both open-ended (14 items) and closed-ended (42 items) items in the form of multiple choice or Likert scale items. The first section contains 18 items to collect the FMs' demographic information and descriptive information about emergency remote teaching. The second part consists of 15 items related to the experience, perception and experiences regarding education and the information and communication technologies (ICT) used during the emergency remote teaching process. In the third part, there are 9 items to gather the respondents' views on distance education. In the fourth part, 10 items were used to collect the FMs' experiences regarding emergency remote teaching. In the fifth and last part, 4 questions were asked to determine the participants' experiences involving synchronous lecture and internet-based teaching technologies in their emergency remote teaching. After the ERT-VQ items were developed, it was piloted with 20 instructors and the detected deficiencies and inaccuracies were corrected. A Turkish linguist also reviewed and checked the items for grammatical and semantic errors.

Data Analysis

ERT-VQs with missing information were eliminated before the analysis, as were repeated submissions. The data were initially organised and elaborated using spreadsheet software. The responses were then analysed to describe the general tendency of the experiences of the FMs. Frequencies, percentages, means and standard deviation were calculated for the items based on convenience. For the qualitative data, thematic analysis was conducted.

Results

The results regarding the research problems examined within the scope of the study are presented separately.

What are the professional development experiences of the FMs regarding ERT?

Findings regarding the FMs' experiences of giving lessons through distance education before ERT are shown in Table 1, demonstrating that the majority of the FMs did not have any experience of distance education before the pandemic.

Table 1
FMs' experiences of distance education before the Covid-19 pandemic

		f	%
Distance learning experience before the Covid-19 pandemic	Not at all	213	60.68
	Once	43	12.25
	2 or 3 times	32	9.12
	More than 3	63	17.95

Findings regarding the number of online professional development activities the FMs participated in during the Covid-19 pandemic are given in Table 2.

Table 2
Number of online activities participated in during the Covid-19 pandemic

		f	%
Number of professional development activities participated in during the Covid-19 pandemic	Not at all	66	18.80
	Once	70	19.94
	2 or 3 times	113	32.19
	4 or 5 times	81	23.08
	More than 5	21	5.98
	Total	351	100.00

It was revealed that the vast majority of the FMs (81.20%) attended a distance education activity at least once for personal or professional development during the Covid-19 pandemic. However, 54.40% of the FMs stated that they did not want to receive any distance education training. When the FMs who responded "Yes" to the statement "I would like to receive education" were asked what kind of education they wanted to receive, they stated that they wanted to learn other applications that could be used in distance education, and to learn applications that could be used to increase classroom interaction and to prepare and execute exams in these environments.

What are the experiences of the FMs regarding ERT?

According to the survey items with the highest score averages (see Table 3), the FMs stated that students could easily access course materials in their ERT courses during the pandemic ($M = 4.18$). However, it was revealed that they spent a lot of time on their courses during ERT ($M = 4.05$) and thought that the distance

education given during the pandemic was not as efficient as face-to-face teaching (M = 4.01). It is important to note that a lack of willingness to teach through remote teaching, having technical problems during ERT courses, and the costs of the technologies used ERT were problems the FMs faced.

Table 3

Results on the teaching experiences of the FMs regarding ERT

Items	M	SS
During my ERT, the students could easily access the course materials.	4.18	.90
My ERT courses were not as efficient as face-to-face teaching.	4.05	1.19
I spent a lot of time lecturing in my ERT courses.	4.01	1.07
I think the measurements and evaluations made in the ERT courses were not reliable.	3.97	1.18
I am thinking of bringing my experiences in distance education during the pandemic to the face-to-face teaching process.	3.72	1.11
I was able to get the necessary support when I had technical problems with my ERT courses.	3.65	1.09
During the pandemic, I had difficulty following the academic development of the students.	3.58	1.24
I observed that my students were reluctant during my ERT.	3.45	1.19
I was able to communicate effectively with my students during the pandemic.	3.38	1.00
I think that my ERT courses were beneficial for students.	3.30	1.02
During my ERT, my students communicated effectively with each other regarding the course content and activities.	3.17	1.11
The costs of the technologies used for distance education were high for lecturers.	3.06	1.31
In my ERT, the students could not follow the courses due to technological problems.	3.08	1.06
During the pandemic, I had technical problems in my ERT.	2.86	1.15
At the beginning of the pandemic process, I was not willing to do ERT.	2.84	1.32

The majority of the FMs agreed with the statement that they could generally communicate with the students during ERT via the software used. They stated that the online training provided prior to ERT was not sufficient, and that they did not have the opportunity to get to know their students sufficiently. Hence, they suggested that the ERT process could not replace face-to-face teaching. One of the FMs described the difficulties they faced during ERT as follows:

> *We had students with internet access problems. I had difficulty in communicating with them. We communicated via email. Participation in the online synchronous classes was unfortunately not shown. This number was very limited. In a class of 70 people, two or three people suffered from a*

similar condition. They knew how to access course materials. I tried to create a democratic classroom environment so that they could participate actively in the lessons. I made a lot of effort to give all of the students the right to speak, but it was more difficult to include some students in online education than in formal education. (220A)

The results shown in Table 4 indicate that the majority of the FMs did not have any experience of distance learning and teaching before the pandemic.

Table 4
FMs' teaching experiences through distance education before Covid-19

		f	%
Teaching experience through distance education before Covid-19	Not at all	222	63.25
	Once	23	6.55
	2 or 3 times	37	10.54
	More than 3	69	19.66

As shown in Table 5, 83% of the FMs lectured in the 2020 spring term. It was noticed that the rate of FMs who prefer to teach synchronous lessons in the 2020/2021 fall term was 95%. The results show that the majority of the FMs said they would give lectures during the pandemic.

Table 5
Experience of synchronous teaching during the pandemic

		f	%
Giving synchronous lessons in the 2020 spring term	Yes	291	82.91
	No	60	17.09
Giving synchronous lessons in the 2020/2021 fall term	Yes	335	95.44
	No	16	4.56

Moreover, in Table 6, the reasons stated by the FMs who answered "No" to synchronous lecturing in the 2020 spring term and the 2020/2021 fall term are presented as qualitative results. As shown in Table 7, among the reasons for this, the FMs stated that asynchronous courses are preferred instead of live lessons, and that live lessons are not preferred due to lack of infrastructure.

Table 6

Reasons for not delivering synchronous lessons in the 2020 spring term and the 2020/2021 fall term

	Qualitative codes	f
Reasons for not delivering live/synchronous lectures in the spring term of 2020 and the fall term of 2020/2021	Preferring only asynchronous lesson	16
	Lack of infrastructure	7
	Not preferred	6
	University regulations	6
	Personal excuses	5
	Having no class	5
	Technical incompetence	4
	Insufficient level of digital competence	3
	Lack of class participation	1
	Security concerns	1

Table 7 presents the results regarding which teaching practices the FMs performed in ERT courses. As shown in the table, 40.5% of the FMs performed all educational practices. However, it was revealed that 17.9% of the FMs performed only one type of teaching activity during ERT.

Table 7

Teaching practices performed by FMs in ERT courses.

		f	%
Teaching practices performed during ERT courses	Live sessions & Sharing course materials	137	39.00
	Only live sessions	51	14.50
	Uploading video lectures to LMSs & Live sessions	8	2.30
	Only sharing course materials	5	1.40
	Only uploading video lectures to LMSs	4	1.10
	Only uploading video lectures to LMSs & sharing course materials	4	1.10
	All of the above	142	40.50

Table 8 presents data regarding the participation of students in synchronous lessons during the ERT process. The findings in Table 8 show that based on the observations of the FMs, the majority of students attended live courses during ERT.

Table 8

Frequency of students' participation in synchronous classes

Item	Code	f	%
Students' participation in online courses	I did not teach live sessions	6	1.70
	Very few participated	36	10.30
	Less than half participated	49	14.00
	Half participated	47	13.40
	More than half participated	163	46.40
	Full participation	50	14.20

How do the FMs perceive the support that was provided during ERT?

Table 9 shows that the majority of the FMs received support to increase their knowledge and skills related to distance education, both technically and pedagogically, during the pandemic. Some of them (14%) stated that they received pedagogical support – reporting having attended online open access courses, seminars and webinars provided by the institution – but it was revealed that this support was more limited in the pedagogical field. It was observed that the technical support received by the FMs was about hardware, infrastructure, online training, content development, and the use of technical and web 2.0 tools. In addition, almost half of the FMs stated that their institutions shared resources and supported them for effective ERT courses.

Table 9

FMs' views on the support provided during ERT

Items		f	%
Receiving technical support before teaching during the pandemic	Yes	101	28.80
	Partially	114	32.50
	No	136	38.70
Receiving pedagogical support to improve competence in distance education before teaching during the pandemic	Yes	48	13.70
	Partially	64	18.20
	No	239	68.10
Degree of affiliated institutions support or sharing resources during ERT	Yes	169	48.10
	Partially	68	19.40
	No	114	32.50

Findings regarding the FMs' motivation for ERT courses and their possible anxiety are given in Table 10. Many of the FMs indicated that ERT has changed their teaching motivation mostly in a negative way: "*ERT increased my workload enormously*" (327A), "*We also need to review students' assignments as mandatory. I'm discouraged to know that this assessment will not be validated.*" (328A). A few FMs indicated a positive motivational effect of ERT: "*I had the opportunity to review and employ instructional technologies for learning and teaching in the Covid-19 period. I thought that my teaching motivation increased as I applied active, participation-enhancing teaching methods.*" (333A).

Table 10

Motivation and anxiety of the FMs regarding ERT courses

Items		f	%
Impact of ERT on teaching motivation	Decreased	173	49.30
	Not changed	145	41.30
	Increased	33	9.40
Concerns about teaching before starting ERT	Yes	122	34.80
	Partially	166	47.30
	No	63	17.90
Concerns in the fall term	Yes	42	16.00
	Partially	127	48.30
	No	94	35.70

Even though the FMs' concerns about ERT decreased from the spring to the fall term, more than half of them still have concerns. The factors that cause concerns include not being able to communicate effectively with students, not being able to predict how the process will be carried out, and possible technical problems in live sessions. Here is a quote from one FM: "*How will I explain the content? Will it be understood? How will I do the assessment? I thought about these questions a lot. On top of that, the students' inability to download course documents and technical problems were added. These things gave me the impression that ERT was inefficient.*" (181A).

What are the views of the FMs regarding online distance education apart from ERT?

As shown in Table 11, the FMs do not believe that assessment and evaluation can be done in distance education as in face-to-face education, nor do they think that the interaction between students, lecturers and students will be

strong during distance education. However, it was determined that the FMs had strong beliefs that giving feedback to students in distance education is important.

Table 11

FMs' views on online distance education apart from ERT

Items	M	SS
It is important to give feedback to students in distance education.	4.44	.77
Distance education is *not as efficient as* face-to-face teaching.	3.95	1.25
In distance education, students can easily access the necessary learning materials for the course.	3.72	1.00
Students can only meet their learning needs through distance education.	3.27	1.08
I think I will use distance education frequently after the pandemic.	2.97	1.22
Interaction between students is strong during distance education.	2.67	1.18
In distance education, the interaction between students and FMs is strong.	2.67	1.09
I will strongly recommend teaching distance courses to my colleagues.	2.63	1.19
Assessment and evaluation can be conducted in distance education as in face-to-face education.	2.47	1.19

How should education be structured in HEIs after the pandemic process?

As shown in Table 12, 81% of the FMs reported that face-to-face teaching should be taken as a basis after the pandemic process and online distance education should be used only for supporting learners before and after face-to-face teaching. In line with this finding, 51.60% of the participants answered "no" to the question "*Would you like to teach some or all of your lessons with distance education after the pandemic process?*" An illustrative quote regarding the response "no" is as follows: *"I think the lessons taught in the classroom are more efficient for both the student and the teacher. Students often do not attend the live class because the lectures are recorded on video anyway, so no questions are asked during the lecture. Then, most of the time, the video recordings are not watched; instead, the students demand a course grade, which reduces productivity.*" (186A).

Table 12
FMs' teaching preferences in higher education after the pandemic

Item	Code	f	%
Teaching structure in HEIs after the pandemic	The face-to-face teaching system should be essential, distance learning should only be supportive.	286	81
	They should conduct all of the theoretical lessons with distance education, studies and exams should be done face-to-face.	34	10
	Theoretical lessons and exams should be remote, and studies should be conducted face-to-face.	10	3
	Theoretical lessons and some practical lessons and exams should be done remotely.	9	3
	Other Answers	12	3
Teaching some or all of the courses online after the pandemic	Yes	170	48.4
	No	181	51.6

Some of the remaining 48.4% of the respondents who responded "Yes" suggested that delivering conceptual knowledge online would enable discussions in the classroom, and distance education could solve many problems. Moreover, they stated that some courses with factual knowledge could be delivered remotely, which will be more efficient for graduate students. Here is an illustrative quote: "*I think that distance education is very suitable for some courses. It has good and effective teaching methods, it can better encourage the enthusiastic and responsible student in some ways.*" (25A).

Discussion and Conclusion

The focus of the present study is to reveal university instructors' teaching experiences at the time of ERT. Thus, teaching and professional development experiences of the instructors and their perception of the support they received and online distance education in general were examined. The experiences of the instructors were mostly negative, except for regarding students' accessibility to the course materials that they provided for the courses. This is somewhat expected, as learning management systems (LMSs) have been readily available for a long time as a platform for sharing course materials, and one would assume that many faculties would be able to utilise this opportunity. However, FMs seemed to spend more time on ERT compared to face-to-face teaching, which implies that they were novices to some extent, and were also learning and adapting to ERT (Raza et al., 2020). This finding is supported by the data

regarding their distance education experiences before ERT (see Table 2). The FMs absolutely believed that they gained more skills about online teaching and learning, and they are willing to apply these skills to face-to-face teaching (Chiasson et al., 2015). Although it is difficult to transfer some skills in different fields, it would be easier if this were accomplished, and it seems that some FMs might update their skills to better adapt to new online education technologies (Maria Hagan & Wassink, 2016). However, the FMs were not satisfied with the efficiency of ERT, nor with the validity of the assessment practices. This is a very common issue across the ERT literature (Gares et al., 2020; Osman, 2020; Wilcox & Vignal, 2020). Consequently, over 80% of the FMs considered that face-to-face teaching should be primary and online education would have a subordinative role. These findings might align with assertions that the perception of online learning as being lower quality than face-to-face learning would be sealed with this massive move to online platforms (Hodges et al., 2020).

Regarding technical issues and the support system for these issues, the instructors did not report a high level of issues in technical aspects, and they gave the impression that support for such issues was at a decent level, despite the fact that almost 40% of them did not receive any technical support before ERT started. It seems that HEIs mobilised their human sources quickly to support the faculty in these emergency conditions (Sayan, 2020). However, it is obvious that no one was ready for this situation, so the competency of support staff and their working conditions are important issues, but unfortunately this cannot be addressed in the present study. Another area of support that is vital for ERT is pedagogical support, which basically deals with how to teach under these circumstances. Studies report that instructors need both pedagogical and technological support to teach online classes (Johnson et al., 2020; Osman, 2020). More than 68% of the FMs surveyed in the present study indicated that they did not receive any institutional support before the classes started. The results showed that without technical support, leaving the faculty to their own resources is like playing a blindfold game in an uncharted land. HEIs tried to deal with minimum requirements to run the programmes, but they could not devise advanced level education focusing on teaching and learning. In other words, ERT just bridged distances between educational institutions and learners, rather than engaging learners in discourse and collaborative learning activities (Garrison, 2009). On the other hand, more than half of the FMs indicated that they sought online professional development programmes or seminars to improve their teaching and participated in one or more of them after ERT started. Although many institutions offered short programmes before the fall 2020 term, especially for pedagogical aspects of ERT, they were not well-established

programmes addressing the comprehensive needs of online education (Cevrimici Egitimler, n.d.; Durak et al., 2020; Hodges et al., 2020).

Many of the instructors had to use LMSs and other virtual classroom tools for the first time due to ERT. Thus, their expertise in using these tools was limited and still is. Although this compulsory shift might improve the skills of some, it might also have a negative impact on the perceptions of others regarding online teaching. This is why some respondents were not willing to recommend using online education and did not plan to do so, which might align with research on the self-efficacy on online teaching (Bandura, 1982). The instructors' perception of student learning, online teaching experience, future interest in teaching online, and satisfaction with teaching online are the main factors that have an impact on self-efficacy (Horvitz et al., 2015). Although the present study does not investigate the self-efficacy of the instructors, which is a limitation, the low scores of indicators from the questionnaire including a lack of the experience of mastery, the perception of student learning, and satisfaction and motivation regarding teaching online, as well as high levels of concern, suggest that the instructors' self-efficacy regarding online teaching is not high enough to strongly apply online teaching tools to their classes. On the other hand, ERT might establish a barrier for some instructors to teach online. Research about the technology acceptance model in teaching suggests that the self-efficacy of users has to be improved in order to adapt to online teaching (Fathema et al., 2015).

The present study was conducted in Turkey by collecting data from 351 FMs from 72 different HEIs out of 207. Even though FMs from a large percentage of institutions were surveyed, the majority of them were affiliated with faculties of education. Therefore, the results may not effectively represent the views of the population.

Implications for Teaching and Learning

The transformation from face-to-face education to online education was urgent and challenging due to the pandemic. Institutional and individual responses to this urgent move might not have solved all of the issues, but they enabled the education service to continue to train people at all levels, including the tertiary level. Some of the lessons learnt from the experiences of the FMs are as follows:

- It is obvious and apparent that the infrastructure should be improved for flawless online education.
- Technical support might meet the demand, but more work should be done in pedagogical aspects in the form of professional development.

Professional development programmes should address instructional design, learning, assessment and feedback in online education, with a clear demarcation between ERT and online learning. Another important aspect that these programmes should emphasise is the fruitfulness and benefits of online education for subject-specific teaching.

- Many of the FMs had to use LMSs and other virtual classroom tools for the first time due to ERT. Thus, their expertise in using these tools is limited and self-efficacy levels are low. More research needs to be carried out to investigate the impact of compulsory ERT on teachers/FMs' self-efficacy beliefs about online teaching.
- Hybrid/blended models should be developed and delivered to address the needs of instructors to support their traditional teaching after the Covid-19 era, as many participants reported that they are willing to apply some ERT skills to support their classes. However, the FMs' self-efficacy beliefs should be improved to include the rest of FMs in order to benefit from these tools.

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Digitisation or Digitalisation: Diverse Practices of the Distance Education Period in Finland

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This case study explores how Finnish primary school teachers orchestrated school days and how teachers and headmasters organised virtual workplace collaboration and collaborated with parents during a period of distance education forced by the Covid-19 crisis in Spring 2020. The data was collected by interviewing primary and secondary school teachers (n = 15) from eight schools in various parts of Finland. Teachers' experiences were analysed with qualitative content analysis. In this study, the school is seen as a Complex Adaptive System (CAS) and the Covid-19 crisis as a disorder forcing teachers to adapt to a rapidly changing environment. Teachers are viewed here as innovators who address both pedagogical and digital challenges under abnormal circumstances. We identify diverse practices at different stages of digitalisation during the distance education period within four domains: 1) structures of school days, 2) forms of teaching, 3) collaborative activities of teachers and headmaster, and 4) forms of home and school collaboration. We also identify three groups of enablers of distance education practices: 1) the use of digital technology, 2) digipedagogical competence of the teachers, and 3) the ability of teachers to act as adaptive innovators. We find that teachers' ability to innovate and to adapt pedagogical and digipedagogical expertise become critical success factors when change is forced upon the educational field. We suggest that the results of this study, portrayed as the enablers and domains of distance education, be utilised in planning post-Covid education. All stakeholders influencing schools at different levels should be included in envisioning and implementing future classroom practices of innovative post-Covid schools.

Keywords: Covid-19, digipedagogical competence, innovation, digitalisation, distance education

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Digitizacija ali digitalizacija: različne prakse v obdobju izobraževanja na daljavo na Finskem

Tiina Korhonen, Leenu Juurola, Laura Salo in Johanna Airaksinen

Študija primera preučuje, kako so finski osnovnošolski učitelji organizirali šolske dneve ter kako so učitelji in ravnatelji organizirali virtualno sodelovanje na delovnem mestu in sodelovali s starši v obdobju izobraževanja na daljavo, ki ga je spomladi leta 2020 vsilila kriza, ki jo je povzročil covid-19. Podatki so bili zbrani z intervjuji z osnovnošolskimi in s srednješolskimi učitelji (n = 15) iz osmih šol v različnih delih Finske. Izkušnje učiteljev so bile analizirane s kvalitativno analizo vsebine. V tej študiji je šola obravnavana kot kompleksen prilagodljiv sistem, kriza covida-19 pa kot motnja, ki učitelje sili v prilagajanje hitro spreminjajočemu se okolju. Učitelji so tu obravnavani kot inovatorji, ki se v nenormalnih okoliščinah spopadajo s pedagoškimi in z digitalnimi izzivi. Na različnih stopnjah digitalizacije v obdobju izobraževanja na daljavo prepoznavamo različne prakse na štirih področjih: 1) sestava šolskih dni; 2) oblike poučevanja; 3) dejavnosti sodelovanja učiteljev in ravnatelja; 4) oblike sodelovanja med domom in šolo. Opredelimo tudi tri skupine spodbujevalcev praks izobraževanja na daljavo: 1) uporaba digitalne tehnologije; 2) digipedagoška usposobljenost učiteljev; 3) sposobnost učiteljev, da delujejo kot prilagodljivi inovatorji. Ugotavljamo, da sposobnost učiteljev za inovacije ter prilagajanje pedagoškega in digipedagoškega strokovnega znanja postajata ključna dejavnika uspeha, ko se izobraževalnemu področju vsiljujejo spremembe. Predlagamo, da se rezultati te študije, prikazani kot dejavniki in področja izobraževanja na daljavo, uporabijo pri načrtovanju izobraževanja v pokovidnem obdobju. V načrtovanje in izvajanje prihodnjih praks v razredih v okviru inovativnih pokovidnih šol je treba vključiti vse deležnike, ki vplivajo na šole na različnih ravneh.

Ključne besede: covid-19, digipedagoške kompetence, inovacija, digitalizacija, izobraževanje na daljavo

Introduction

Distance education and education during Covid-19

The Covid-19 crisis has had a massive effect on schools, students, teachers, and families around the globe. In many countries, the crisis led to school lockdowns, and education transitioned from face-to-face settings to distance learning with little or no preparation time. The impact of these changes will be long-term and continue after the end of the immediate crisis (Schleicher, 2020).

Remote or distance education was already an increasing global trend before Covid-19, strengthening with the development of technology (Mäkelä et al., 2020; Palvia et al., 2018). In industrialised countries, distance education for K-12 students has been applied to solve school crowding challenges, subject availability, and meeting the need for learning at different paces and places (Cavanaugh et al., 2009; Cavanaugh & Clark, 2007). In Finland, distance education has been used to augment traditional learning environments and has been a topic of educational pilot projects. Online solutions have been used in Finnish primary and secondary education for teaching languages and for teaching students with exceptional circumstances or disabilities (Ilomäki & Lakkala, 2020; Kotilainen, 2015). Distance teaching solutions were seen to be justified when they solved issues of accessibility, provided more opportunities for learning, such as wider availability of subjects and increased equality in remote areas (Kotilainen, 2015).

In Finland, primary and lower secondary teaching moved to distance education by government decree during the Covid-19 pandemic in the Spring of 2020 for approximately two months (March-May). Teachers had two days to adapt to this change. According to Ahtiainen et al. (2020), most students studied at home throughout the period with no physical contact with the school. In the government distance learning guidelines, 1st to 3rd graders whose parents worked in critical professions were allowed to attend face-to-face teaching, as were students with special needs who could not be taught from home. Thus, teachers worked from either home or school.

Initial surveys in Finland about education and wellbeing during Covid-19 targeting headmasters, teachers, students, school staff, and parents found that practices in solving the challenges of distance education varied among schools and that students adapted differently to the changes. Some students found that they benefited from distance learning, whereas others lacked the prerequisites for distance learning and felt that they learned less than they would have in traditional settings (Ahtiainen et al., 2020; Iivari et al., 2020).

Variation in distance learning practices was evident in the frequency of online lessons and thus regular interaction with students. Variation also occurred in evaluations. (Ahtiainen et al., 2020; Karvi, 2020). In this situation, the role of support from home and family increased, further widening existing divides. Although less personalised support was available than in a face-to-face setting, teachers innovated new ways for bringing such support to the remote environment. Innovation extended to other communication practices; practitioners found remote conferencing with colleagues and parents to work well (Iivari et al., 2020; Karvi, 2020).

Globally, schools faced similar challenges in taking on distance education, including instructional and pedagogical arrangements, collaborative activities, as well as teacher competence and readiness issues (Schleicher, 2020). Recently published studies address different dimensions of these challenges, and some provide concrete tools and instructional design models for practitioners. For example, Donaldson (2020) identifies the need for supportive networks and describes design principles for digitally enhanced communities of practice (DECop) in this new educational situation. The need for ideating and iterative development is highlighted in a study that offers a pedagogical 'toolkit' for teachers to help respond and adapt to students and class groups' physical and digital needs (Flynn, 2020). Studies also address the challenges of moving hands-on activities to an online form. For example, the use of videos in demonstrating artefacts, improvised teaching, and providing platforms for peer engagement and collaborative learning are seen as potential directions (Jayathirtha et al., 2020).

School as an innovative and complex adaptive system

The multifaceted nature of the situation for schools in the face of this pandemic is well illustrated by the Complex Adaptive Systems theory (CAS), a complexity theory whereby systems adapt and evolve when faced with change (Mitleton-Kelly, 2003). The theory helps build an understanding of the complexity of the school system and its adaptivity during a disruption (White & Levin, 2016). According to CAS, systemic activity is based on the interaction between connected actors. The theory looks at unstable states (non-equilibriums) as possibilities for emergent creative solutions and for new ways of working. Change requires a shift into an unstable state. Instability can manifest in various ways, and it may be an ongoing reality for schools, not always resulting in innovation or educational change. Shifts may be caused intentionally with particular aims in mind or unintentionally, as was the case with the Covid-19

crisis. When disrupted, systems can take up multiple possible solutions. Individuals making decisions in this situation are affected by their history, their current state, and the state of their environment. These decisions can lead to innovation and exploration within the realm of possibilities. Social systems allow for support and choice when disrupted.

In the school context, these change processes can be approached through innovation-driven theories such as the theory of the diffusion of innovations (Rogers, 2003), the theory of educational change (Fullan, 2015), and the Innovative School model (Korhonen & Lavonen, 2017). The Innovative School model combines the theories of Fullan and Rogers with practical development work of schools aiming at holistic change. The model considers all actors in the school context as participants and innovators: students, teachers, headmasters, parents, and community stakeholders. The interrelationship between actors is complex and occurs across levels (Fullan, 2015). The model is supported by research indicating that participant involvement in innovation implementation and reinvention increases the odds of continued use and development of the innovation. n the model, detailed by Korhonen and Lavonen (2017), collaboration is encouraged on all levels with peer-to-peer learning among students, teamwork between teachers, in home and school collaboration, and in various partnerships. The comprehensive and versatile use of technology in learning and teaching is a guiding and cross-cutting principle in the model. The model shifts the focus to operational innovations, extending innovation from hands-on learning innovations to entire school practices such as school day structures and teacher collaboration.

Teachers as autonomous curriculum implementers and innovators

In the Finnish educational setting, the teacher is viewed as an autonomous implementer of the curriculum who can make independent decisions regarding teaching methods and tools. Some boundaries are set at the municipal level, but implementations vary widely (Lavonen, 2020). Teachers are also involved in the curriculum development process and are expected to make decisions that align with the curriculum and support students' learning (Halinen & Järvinen, 2008). During the Covid-19 crisis, Finnish municipalities and schools had, in international comparison, a relatively high autonomy to choose how to react and to organise alternative education (Schleicher, 2020). This autonomy brings with it both freedom and responsibilities. The autonomy and trust given to teachers is a key factor in why the profession is seen as attractive. Challenges of the autonomous teacher include teaching 21st-century competencies, meeting

the needs of diverse students, and mastering changing learning environments and technology (Tirri, 2018).

As the autonomous implementers of the curriculum this exceptional period calls for the ability of teachers to not just adapt to changing circumstances but also use innovation skills to create new practices. Innovation skills are a type of 21st-century competence that enables the person to solve real-world problems and innovate with others (Korhonen & Lavonen, 2017). The individual's contributions to these tasks are considered innovative work behaviour (IWB) (Messmann & Mulder, 2014; Thurlings et al., 2015). Innovativeness and newness are determined in this study in relation to the users' experiences; specifically, a practice may be known to some but novel to others (Rogers, 2003).

Digitalisation and the digipedagogical competence of teachers

The need to develop schools' and teachers' digital competences has been present in educational discourse for the past two decades. These developments are driven by the digitalisation of society and an increasing need for teachers to be able to guide students in acquiring 21st-century competences, including cross-cutting digital competences. To meet these challenges, the previous Finnish government (2015-2019) launched the concept and goal of a 'digital leap' and invested in the digital competences of teachers and teacher educators. As a result, the concept has been prominent in Finnish public discourse and had a role in putting pressure on teachers and schools (Saari & Säntti, 2018).

The discourse lacks a definition of digitalisation; often, there is talk about *digitisation* instead of *digitalisation* in the educational context. Digitisation is a technical process of moving information into digital form, whereas digitalisation refers to changes in ways of working that utilise digital technology (Tilson et al., 2010). Moreover, public conversations have not brought up the different levels of digitalisation or what is leapt over. Barras (1986, 1990) views digitalisation on three levels. On the first level, technology is used to enhance the efficiency of existing services. On the second level, technology is used to improve quality in addition to efficiency. On the third level, technology is used to create completely new or adapted services or ways of acting (Barras, 1986; Barras, 1990). According to Vivitsou (2019), the digitalisation in the educational context can be seen as a metaphorical idea that firstly requires a leap in thinking from the technological to the educational domain and secondly a review of pedagogical methods and changes in educational practices (Vivitsou, 2019).

Various terms have been used to describe teachers' pedagogical use of technology and skills within the realm of digitalisation of education. Such terms

include ICT skills (Tanhua-Piiroinen et al., 2020), ICT competence (Tanhua-Piiroinen et al., 2020), teachers' digi-skills or competence (Tanhua-Piiroinen et al., 2019, Tanhua-Piiroinen et al., 2020), or TPACK, Technological Pedagogical Content Knowledge (Mishra & Koehler, 2006). Research results show Finnish teachers' digi-skills vary from weak to expert: based on teachers' evaluation, 10% of them reported lacking digi-skills, 53% basic-level skills, 33% advanced and versatile skills, and 4% expert-level skills (Tanhua-Piiroinen et al., 2019) with 60% of teachers having received in-service training in technology (OECD, 2019). A Finnish education survey during Covid-19 found that 95% of teachers reported that their overall digital skills increased at least a little during distance learning, and 41% reported a substantial increase (Ahtiainen et al., 2020). Niemi and Kousa (2020) found in their study that even though teachers learned to use technological platforms rapidly, the quality of interaction was lacking.

In this study, we consider the digital skills teachers need in a rapidly changing and digitalised society and propose using the concept of digipedagogical competences. The definition includes the teacher's technological pedagogical content knowledge and the ability to apply this knowledge in different situations (Mishra & Koehler, 2006). We refer to this set as digipedagogigal skills. The broader concept of digipedagogical competences includes, in addition to the latter, the will (Kopcha, 2012) to use this knowledge and skills to support students' learning, collaboration and interaction. Moreover, digipedagogical competences include using and adapting technology in collaboration with colleagues, parents, and networks. Technology is seen not only as a tool for teaching, learning, interaction and innovation but also as an object of learning (Korhonen & Lavonen, 2017). Thus, digipedagogical competence also includes the teacher's epistemic knowledge of digitalisation, for example, teacher's knowledge and beliefs (Ertmer et al., 2014) about digitalisation, digital technology, and its benefits to teaching, as well as its societal impact. This affects teachers' attitudes towards digitalisation in education (Korhonen et al., 2021) and their ability to adapt and innovate technology use in pedagogically meaningful ways (Korhonen & Lavonen, 2017).

Research goals

The purpose of this study was to explore how Finnish teachers orchestrated school days and how teachers and headmasters organised virtual workplace collaboration and collaborated with parents during the period of distance education forced by the Covid-19 crisis in Spring 2020. We are also interested in the tools and software used, how they were used, and how teachers experienced

their own digipedagogical and innovation competence. The research questions addressed in this study were as follows:

1. How did teachers organise the school day activities?
2. How did the work community function and support teachers?
3. What was home and school collaboration like?
4. What kind of tools and programmes did teachers use during distance education, and how did they use them?
5. How did teachers describe their digipedagogical and innovation competences?

Method

Participants

For this study, 15 teachers with varying teaching experience and teaching various age groups were chosen as interview participants. The teachers work in eight primary and lower secondary schools in Finland. Table 1 lists the study participants with their background data. In selecting the participants, we utilised a national school innovation network and its regional coordination areas. Teachers were chosen from eight coordination municipalities representing various regions from all parts of the country and different size schools. Teachers with and without special roles were chosen for the study.

In Finnish basic education, most teachers work as either *class teachers* in primary school, teaching 1st to 6th grade (ages 7–12), or as *subject teachers* in lower secondary school teaching 7th to 9th grades (ages 13–15). Each class in lower secondary school also has a teacher designated the *class supervisor*. In addition, there are also special education teachers focused on special education classes or supporting the individual needs of students of the whole school in both primary and lower secondary levels.

Table 1

Study participants: subject indicates if the participant teaches a class of a specific subject; special roles refer to teacher's secondary duties, if any

ID	Subject	Grade	Students	School size and area	Region	Experience (years)	Special roles
1	Class	1st	6	Medium Urban	Western	11	Tutor teacher
2	Class	1st	23	Medium Urban	Eastern	4	ICT responsible
3	Class	2nd	17	Small Rural	Eastern	5	-

ID	Subject	Grade	Students	School size and area	Region	Experience (years)	Special roles
4	Class	2nd	20	Medium Urban	Eastern	10	-
5	Class	3rd	18	Large Urban	Central	18	-
6	Class	3rd	18	Large Urban	North-ern	25	-
7	Class	3rd	20	Large Urban	North-ern	32	-
8	Class	4th	16	Large Urban	Capital	1	Digi-tutor
9	Class	4th	32*	Small Urban	Capital	29	Vice headmaster, tutor teacher
10	Class	5th	16	Small Rural	Western	25-30	Vice headmaster, digipedagocical trainer
11	Class	6th	27	Large Urban	Central	9	-
12	Class	6th	18	Small Rural	Eastern	25	Headmaster
13	Class	6th	9	Small Rural	Western	20	Tutor teacher
14	Crafts	7-9th	7 × 18**	Large Urban	Eastern	8	-
15	STEM	7-9th	10 × 20***	Medium Urban	Western	13	-

Note. *Team teaching group; **7 groups, 18 per group; ***10 groups, 20 per group.

Data collection and analysis

The data acquisition method was semi-structured interviews conducted during Spring 2020 between the 18th of May and the 4th of June 2020, when schools had just returned to face-to-face teaching after a two-month distance education period. The interviews lasted from 54 minutes to 1 hour 48 minutes and were conducted on online platforms by four researchers. Participating teachers were interviewed about how they organised their distance school days, collaborated with the work community and parents, utilised technology, and developed digipedagogical expertise.

This study takes a qualitative approach in describing and understanding the impact of the Covid-19 crisis on the individual teacher within the context of their school and working community. The data were analysed by inductive content analysis, as there was an interest in examining teachers' novel distance education practices as they came to light in their interviews (Elo & Kyngäs, 2008). The unit of analysis was defined as a single coherent idea (Saldana, 2016); in the analysis, the number of mentions (*n*) is presented. Each mention can belong simultaneously to one or more categories as it can contain different perspectives. Initial analysis categories were derived from the interview questions, after which

the data was reviewed multiple times across investigative cycles to construct the main categories and subcategories. To improve the reliability of our analysis, the first and second authors refined the categorisation framework by testing and re-testing in relation to the data excerpts. Finally, units were coded based on the categorisation framework as domains and enablers of distance education.

Results

Practices during distance education (research questions 1, 2 and 3)

We identify types of practices within four domains: 1) structure of school days, 2) forms of teaching, 3) collaborative activities of teachers and headmaster, and 4) forms of home and school collaboration (Table 2).

Table 2

The identified domain and their practices, with the number of mentions n for each practice and an example of a mention of the practice (translated from the original Finnish)

Domain	Type of practice	n	Example of mention
Structure of school days	Schedule	92	*We had 45-minute classes and then a break and lunch break was half an hour, so that was like a very routine daily schedule.*
	Meetings	38	*I always had the first meeting quarter past eight in the morning, which became like a routine.*
	Breaks	12	*Not a 15-min break after each class, but we were looking at fitting small breaks into gaps*
Forms of teaching	Teacher-led teaching	158	*Of course, there was quite a bit of that old-fashioned teaching in the beginning, where the teacher says how things are and what we do.*
	Independent work	149	*The ideas in arts and crafts were such that they could be done at home at their own pace, and you got the idea readily from the instructions.*
	Individual guidance	114	*I had specific supporting teaching after school days, and we agreed that certain students would join me online at the end of the day, and we'll then get back to things together in more detail.*
	Evaluation	84	*During this distance schooling period, we also did have exams, and I got the submissions by email or somebody even submitted by WhatsApp.*
	Group work	31	*We had in Teams a team for each school subject, and I created groups in each team; I changed the roster around in different subjects a bit and sometimes said that I would set up new channels per group so that you could decide on the groups yourself.*

Domain	Type of practice	n	Example of mention
Collaborative activities of teachers and headmaster	Peer-support	219	*[Collaboration] was certainly very important; we worked out many technical issues and also just practical things and what we're going to do during the week and how we progress with students.*
	Leadership	143	*Our headmaster has really put their neck and effort into this and did a lot of work to make teaching succeed during the distance ed period and also after that as we got back to normal school.*
Forms of home and school collaboration	Communication	84	*I always notified of important things in Wilma. Parents read Wilma and I told the kids the site where I run teaching. After a couple of rounds, everybody found their way to the site at 8 or 9 in the morning.*
	Support for students	60	*We put Meetti (Google Meet) into use very quickly; I had like a permanent link that students knew well, and parents of course helped, so it would not have come to that without parents helping at home.*
	Support for parents	23	*There were also families where parents could not really use these either so we for sure had long support calls and also called home like how you should start up these gadgets.*

Structure of school days

Schedule. Teachers described the sudden pressure to rapidly build a whole new daily school routine. They emphasised pedagogical sensibleness in their practices: accounting for students' age group, meaningfulness, and support for students' individual progress. Some teachers strove to shape school days to be as similar as possible to in-school teaching, while others immediately considered the possibility of restructuring for distance teaching and the capabilities of distance working.

There were considerations about teachers' digipedagogical competence, their ability to apply their skills in a new situation, and their circumstances at home as their spouse and children were also working and studying from home. The devices, programmes and services available played a significant role in schedule planning. Equally significant was the teachers' ability to plan the use of these tools in a meaningful way for both independent and joint work. Moreover, guidelines and conditions set by the headmaster or the municipality influenced the schedules.

Several class teachers described shortening school days. Teachers justified this with references to student wellbeing and the opportunity to add time for individual guidance to the end of group teaching. Subject teachers in secondary school also relaxed the schedule as students were allowed to work relatively independently.

Teachers reported challenges in planning their workdays. For example, if schedules were not clearly communicated to students and parents or not

internalised by the teacher, the latter risked stretching their work hours. In addition, due to some students being allowed to attend face-to-face teaching at school, some teachers were required to adapt their schedule to teach both their own class online and another class in a face-to-face setting, taking turns in face-to-face classes with colleagues.

Meetings and breaks. All interviewed primary school teachers organised a joint morning meeting similar to face-to-face school where students reviewed their previous day and teachers introduced the day's schedule and tasks. Teachers also often used this session to teach one of the day's topics. The rest of a student's school day alternated between independent work, breaks, and possibly joint sessions where the teacher either went through students' tasks or taught new lessons. Secondary school teachers describe the school day as consisting of joint meetings and tasks disseminated to students. The schedule was constructed from possible morning meetings with the class supervisor and tasks set by various subject teachers.

Teachers also noted the importance of taking breaks, which are especially evident in primary school distance teaching, where there were often longer teacher-led sessions. Some teachers scheduled breaks similarly to face-to-face school days with 45-minute lessons followed by a 15-minute break. Other teachers had a different rhythm with both longer teaching sessions and longer breaks.

Forms of teaching

Teacher-led teaching. Teacher-led teaching included the above-described morning meetings, possibly with teaching sessions and any other teacher-led activity. When discussing the different subjects taught, teachers often started with mathematics teaching. They found it natural to follow the normal mathematics lesson structure in distance learning with first checking homework and then learning a new topic. Ready-made digital mathematics learning materials from commercial publishers worked well when shared via the teacher's screen. In addition, some teachers gave students reflection tasks, after which students were allowed to leave the joint session and work independently or stay in the meeting and get help from the teacher.

Independent work. Teachers reported giving much thought to the suitable length of teaching sessions for each age group. They pondered the balance of joint and independent activities and observed that working and learning from home requires a new form of self-responsibility and self-discipline. Especially among 1st- and 2nd-grade teachers, there were reports of shortening the length of teacher-led work based on their observations. Some teachers guided students

to work independently with daily or weekly guidelines or in both ways, giving daily guidelines for some subjects and weekly tasks in other themes.

The role of independent work was especially emphasised in arts and crafts. Both classroom teachers and subject teachers described guiding students in arts and crafts solely towards independent work. teachers utilised many ready-made online materials and, for instance, in handcrafts, tasked students with assignments related to housekeeping themes.

Directions for independent tasks were often found on a platform available to students, where the teacher had also included homework and possible additional materials. The same directions were usually communicated to parents via Wilma, a web interface used for home and school collaboration. A secondary school teacher described varying ways to instruct weekly assignments: some teachers gave students separate instructions for every subject, whereas some teachers decided to create a shared document where each subject teacher marked the following week's tasks on a weekly basis. This arrangement made it easier for students to follow the guidelines of many teachers.

Individual guidance. Teachers often brought up individual guidance to students and its importance. The primary function of individual guidance in distance teaching was reaching students and noticing students' individual needs. At the beginning of the day, both class and subject teachers checked that students were present. If there was an uninformed absence, teachers attempted to reach the student in various ways. In these situations, special education teachers were of assistance in some schools.

Teachers described several ways of giving individual guidance, such as remedial instruction similarly to face-to-face settings or staying behind at the end of the online joint lessons. Another form of individual guidance that required self-directed action was the possibility to call the teacher at a specified time. Individual guidance was also given at the teacher's initiative. If a teacher noticed a student in need of support, they were in personal contact with the student and provided that guidance. Some teachers reported making a weekly round of calls to students asking how they were doing and learning about possible needs for support.

Evaluation. During distance education, ongoing evaluation through checking assignments and giving both oral and written feedback was highlighted. In addition to ongoing evaluation, a few teachers mentioned that they gave tests or exams to students. In one class, a teacher mentioned using an online evaluation platform.

Group work. Teachers described challenges in organising group work during distance education. Implementation challenges were mostly comprised of teachers' lack of digipedagogical competence, which meant that teachers

could not adapt the used platforms for group work and divide students into groups. Moreover, most platforms used at schools during Spring 2020 did not yet have these group features. Despite this, some teachers were successful in guiding students in pair or group work. The absence of group tools was solved in many ways: by directing students to call their partner on the platform and work together, creating an open and recurring meeting link for students to join anytime, or setting up each group with their own channel on the platform.

Collaborative activities of teachers and headmaster

Peer support. Teachers described diverse ways of collaboration and the peer support received in planning teaching, creating learning materials, and putting teaching into practice. Teaching was planned, and materials were created in age- and subject-level teacher groups. Other group formations were primary and secondary school teacher groups that could include a special education teacher. The groups were existing teacher teams such as a digi-team, or groups that formed spontaneously or were put together by the headmaster. Teachers collaborated either in distance form or in face-to-face settings at school.

Teachers reported that support from other teachers helped them cope in an uncertain and completely new situation. Informal or formal messages and discussions led by the headmaster or colleagues helped teachers solve problems relating to organising and implementing distance education. Peer support in issues involving digital technology was often evident in teachers' speech. Sharing the workload and responsibilities was also mentioned. For instance, some of the primary school teachers in the same grade level observed that it is beneficial to divide planning responsibilities for teaching among teachers. Other teachers, in contrast, described situations in which some teachers were unwilling to collaborate or receive help from others.

Leadership. School leadership was brought up from the point of view of clarity, accessibility, and safety. In some schools, the school headmaster and vice headmaster reacted to the situation quickly, delivering clear guidelines to teachers on the headmasters' role in disseminating general guidelines as well as on how to implement distance teaching and communicate with parents. In other schools, teachers felt that the directions given by the school were confusing: directions were given from both the school management and from the municipality separately, and the teacher lacked adequate guidance on platforms that were available for use in distance education. In addition, teachers felt that this dual-level guideline and changes in directions during the distance education period were stressful. The criticism was especially targeted at the municipality level.

Varying ways of leadership were evident also in the accessibility of headmasters. Some teachers mentioned always getting answers to their questions, while others stated that they did not receive enough support from management. The feeling of safety is also mentioned with regard to headmaster accessibility and the nature of given directions. The headmasters' encouraging, sturdy and positive grip on the situation made teachers feel that the situation was under control. The customs for joint meetings led by headmasters varied from school to school, from headmaster-led announcement meetings where the teachers were merely listeners to meeting customs where headmasters arranged the possibility for questions and structured participation.

Forms of home and school collaboration

Communication. The accessibility of teachers, students, and parents was a key factor in home and school collaboration. Some of the 1st- and 2nd-grade students were hard to reach due to the lack of practice in using online platforms. Similar challenges were apparent in some higher grade levels. Teachers also had to consider which of the platforms were available to students and which to parents. Parts of the platforms used were intended only for parents (e.g., the Wilma home-school collaboration platform) and some only for students (e.g., Teams). Some of the teachers reported that, at times, parents were also hard to reach. Some families did not want to use digital technology as a matter of principle. Teachers showed understanding of the families' demanding circumstances and matters of principles. Teachers took up a 'mentoring' role in supporting families in adopting the necessary technology or finding alternative communication forms in distance education.

The accessibility of teachers also had a significant role in home and school collaboration. Some teachers described clearly setting boundaries to the time when they were available. Some teachers, in turn, depicted being at their students' disposal at all times. Teacher communication to parents happened on a daily basis, a couple of times a week or once a week. Some teachers reported taking up individual phone calls with all parents at least once during distance education.

Support for students. Students received support in distance education from both teachers and parents. Teachers describe students receiving support from parents in both organising the school day and the study topics. Teachers were grateful to parents for supporting students in this new and abrupt situation and guiding them into a new way of going to school. Some teachers reported that they wanted to avoid putting pressure on parents to guide their children

in distance learning, because they were aware that in most homes, parents and siblings also worked from home. A portion of teachers adapted their instructions for tasks in consideration of these circumstances.

Some teachers expressed the challenges of some students in distinguishing being at home from distance schoolwork and in understanding the time used for schoolwork in distance learning as compared to normal school. Some of the older secondary school students had not comprehended the time usually spent on school and homework. Students felt that the time allocated for assignments was too long even though they had used only a fraction of the time on it compared to normal school days. In these situations, the importance of teacher and parent guidance increased. Support from the special education teacher was also utilised in many ways. In one school, the special education teachers worked with the individual students who had challenges in participating in distance education when in other schools they worked to support special education classes.

Support for parents. Teachers supported parents during distance education by messaging them via various channels about how teaching was carried out and by directing them in guiding the student at home. Teachers' support for parents in adopting technology was often mentioned when describing home-school collaboration. Some teachers reported guiding parents by hand, so they could get programmes and services to work at home.

The teachers' descriptions of collaboration with parents during distance education reflected, for the main part, a sense of a common goal. A mutual desire to organise school activities in an otherwise uncertain and chaotic time was depicted clearly in teachers' reports. The willingness to support parents and hear their thoughts was also telling in the messages and phone calls to homes. One teacher reported doing a survey for parents at the beginning of distance education to get the widest possible perspective on the situations at home to consider in their work. Similar surveys were given in some schools to all parents.

Enablers of distance education practices (research questions 4 and 5)

We identified three groups of enablers that cut across and affect all the four domains of distance education practices: 1) the use of digital technology, 2) the digipedagogical competence of teachers, and 3) teachers' ability to act as adaptive innovators (Table 3).

Table 3

The identified enablers and enabled groups, with number of mentions n for each enabled group and an example of a mention of the enabler (translated from original Finnish)

Group	Enabler	n	Example of mention
Use of digital technology	Tools and services	377	In Teams we certainly used the features we have there, we have there tasks and questionnaires and I event started 'youtubing' like my students say, as I sometimes did YouTube videos for crafts.
	Usability	228	Submissions were for the most part in picture format because it was easier for them.
Digipedagogical competence of teachers	Digipedagogical skills	187	I guess overall our teacher cadre is pretty good at using those. I am not, like, specially good compared to colleagues, but I would say I have pretty good skills.
	Attitude	139	After the initial shock, we got it running really well, and I started actually enjoying it and noticed that distance learning improved, and I would not have liked to stop as I got it working so incredibly well, very good vibes.
Teachers as adaptive innovators	Problem solving and creativity	112	That I could create tasks in crafts that they could do at home.
	Co-creation	73	We saw each other like each morning, so it was a bit like part of normal, work day, and then we exchanged ideas and figured out how to do things.

Use of digital technology

Tools and services. The sudden transition to distance learning brought to light a real inequality in terms of equipment availability. Some of the teachers were issued phones and laptops; for some, neither were provided by their employer. Equipment availability also varied for the students, with some having access to both a laptop and a tablet through their school while some students were left without access to a computer. Schools borrowed equipment for homes that could not arrange one for the student. Homes with multiple students faced an especially challenging situation, forcing the students to take turns with the equipment. Some students relied solely on their smartphones.

The devices, software, and services had a major impact on the structure of the school day, as well as on teaching and home-school collaboration practices. Teachers described communicating in a plethora of ways, including messaging (calls, chat, text messages, Wilma, WhatsApp) and online meeting platforms (Teams, Pedanet, Google Classroom and others). In their teaching,

the teachers utilised various cloud services, ready-made videos, or videos they recorded themselves, learning features of online meeting platforms and ready-made online learning materials from commercial publishers. They started their day in a video call (Teams, Google Hangout, Meet) and delivered daily/weekly learning tasks to students through online platform folders or in chat messages. They ran teaching sessions on a video conferencing platform, sharing their self-made or commercial learning material on their screen. Many sessions, such as those for checking student status, were plain video conferences. Some teachers describe their efforts to engage students using the free versions of the Padlet and Kahoot services and to arrange exams using the Socrative tool.

Teachers created their video learning material using, for example, the free versions of screen recording software. They created video content to remedy the lack of textbooks or other learning material and allow students to review their teaching later. Some teachers mentioned discovering the usefulness of self-made videos for students' learning and their intention to continue the practice.

Teachers described inventing their own mechanism for submitting assignments, which was necessary when they did not have access to online platforms or did not have the skills to use one. 1st- and 2nd-grade teachers and other lower primary school teachers made extensive use of WhatsApp, both in communication and as a tool for submitting pictures of assignments. Using WhatsApp brought out various questions about online privacy and user age limits. Some teachers were aware that these limits would prohibit the use of certain services but still used them, justifying the use by the acute situation. Other teachers did not possess information about the allowed/disallowed services. Some parents explicitly prohibited their children from using certain services on the basis of age limits or privacy.

The teachers also utilised the same software and services for collaboration with their colleagues. Weekly faculty meetings were arranged as video-conferences, and the primary communication channel between teachers was instant messaging.

Usability. Teachers mentioned usability considerations related to network connectivity, software and service user experience, and service access. They mentioned both positive and negative experiences. Working devices, software, and services received praise, with teachers who had their first exposure to their use describing their enthusiasm stemming from their positive user experience. Typical usability challenges included network issues (dropped connections or slowness) and various error cases in software and services. One teacher in a school using multiple online platforms described the overwhelming array

of services and their confusing use. They felt that selecting a primary platform would be important.

Digi-pedagogical competence of teachers

Digipedagogical skills. The distance learning period made teachers think about their own and their colleagues' digipedagogical skills. They described teachers who could not tell the difference between local files on a computer and files shared on a cloud service and teachers who had never been on a video call. In contrast, some of the teachers acted as digital tutors in their school or as trainers in regional or national networks and have wide-ranging expertise in both the device, software, and service technology and their pedagogical application. Teachers thought about the reasons for this skill gap (e.g., teachers' unwillingness to get trained on or self-learn the use of digital technology in teaching and collaboration). One teacher reasoned that their skill gap came from teaching Grades 1-2 for several years and thus not being exposed to advanced tools.

Differences in teachers' skills affected their pedagogical choices. Some used technology only for communication, placing their students primarily in self-study mode at home. Other teachers who were more skilled with technology made flexible and extensive use of it, allowing their students to benefit from other learning modes involving joint and group sessions.

On the one hand, teachers with weaker digipedagogical skills described their insecurity in arranging remote teaching. They would have needed more detailed guidance in selecting and using devices and software. Teachers mentioned spending a great deal of time attempting to copy their face-to-face teaching practices to a remote setting without realising that the tools afford simpler ways to achieve the same goals. On the other hand, several teachers said that the forced situation activated their willingness to adopt new digital methods. Some teachers with weaker skills realised that the technology is not so hard, motivating them to further use.

Teachers pondered the roles related to digipedagogical skills development in their school and the visibility of the current skill level. In some schools, the responsibility for advancing these skills was with a special digital teaching advocacy role (ICT-responsible or digi-tutor); in other schools, several teachers contributed to skills development. They also described teachers who actively avoided digital technology and learning the related skills. According to the teachers, the distance-learning period brought out skilled teachers who could have normally been overshadowed by the more skilled special advocates.

Teachers also spoke about their need for personalised training; they longed for focused training that would start from their needs and personal support in developing their digipedagocical skills. They also mentioned the lack of time and lack of a learning community in their school. Some teachers called for the definition of a basic digipedagogical skill level that all Finnish teachers should reach.

Attitude. According to teachers, key factors influencing the development of digipedagogical competence were fears, prejudices, and attitudes toward technology, the use of digital technology and the development of related skills. Some teachers feared learning about digital technology because they felt that they had inadequate skills. They may have passed over training opportunities for a long time and felt that the fast pace of technological development built up an insurmountable learning challenge.

Attitudes toward the use of digital technology ranged from highly positive to negative. Some teachers described a change in their attitude during the distance learning period. After they were initially forced to use the technology, they reviewed their thinking and found some of their preconceived notions false. Skill development that was earlier seen as an activity controlled and demanded from the outside now became a pressing, internal, and personal need to get skilled to cope with the sudden situation. When discussing the forced situation, teachers mentioned an increased sense of community and a wish that all their colleagues would have assumed a more positive attitude towards skills development. They also called for courage to try without fear of failure and for the involvement of students in advancing teachers' digipedagogical skills.

Teachers as adaptive innovators

Problem solving and creativity. Teachers said that, especially at the start of the distance learning period, they were constantly creating new practices for teaching and collaboration with colleagues and homes to address previously unforeseen problems. They felt that problem-solving skills and creativity were key in setting up working practices. Teachers described innovations in teaching arrangements, including teaching methods, teaching content, and learning materials.

Teachers realised that letting go of familiar practices and innovating new ways was the only available course of action. As a result, some teachers previously stuck in their ways learned to enjoy solving challenges and rediscovered their passion for their work. Teachers also realised that the work and new tools during the period have supported both them and their students in practising their logical reasoning and innovative problem-solving skills.

Co-creation. Collaborative brainstorming, sharing, and benchmarking ideas helped teachers find distance learning practices that worked for them and their students. Several teachers shared responsibility for designing and implementing distance learning with their colleagues. This activity guided them towards collaborative ideation. Some teachers felt that tighter collaboration became a necessity and that traditional obstacles for collaboration were overcome. Several teachers described how they shared digipedagogical skills and innovated together on the use and the challenges of devices, software, and services. Their collaboration grew in steps or started in full force right away. Some teachers also described situations in which some of their colleagues were not ready to collaborate or participate in collaborative ideation.

The experience of taking part in close collaboration and receiving peer support during the distance learning period prompted teachers to think about the ongoing role of collaboration in their work. They had participated in collaboration before the period but felt that they had found new ways to engage in deeper collaboration, ideation, and sharing of responsibility.

Discussion

The results described practices in use during the distance learning period as well as enablers that made deployment of the practices possible.

Distance learning practices

According to the results, teachers built their school day structure in various ways by combining online meetings and breaks. Some teachers strived to have the distance school day resemble normal face-to-face school days and planned accordingly. However, other teachers planned and implemented teaching with considerations of the new situation and possibilities of distance teaching. The results show that students' age, available tools and programmes, teachers' digipedagogical competence, and the circumstances of homes influenced the planning of structure and the implementation of school days.

Forms of teaching varied from teacher-led sessions to independent work. Finding a suitable rhythm and balance was especially challenging for teachers at the beginning of distance education. Teacher-led work included morning meetings with the whole class, teaching various subjects, going through guidelines, and catching up with students. The role of independent work was emphasised. The challenges of organising and implementing pair and group work were similar to those in other countries (Schleicher, 2020). The challenges of

collaborative work were dependent on teacher and student skills and the available platforms.

The first published results from the Covid-19 distance learning period in Finland hint at insufficient and unequal personalised guidance (Ahtiainen & al., 2020; Karvi, 2020). However, the results of this study show individual guidance as one of the key considerations for teachers as they planned and implemented distance learning. Teachers were foremost concerned with students' accessibility and with their own ability to notice needs for support. Individual guidance was available at the initiative of either the teacher or the student.

Earlier studies emphasise the collaboration between teachers, clear collaborative structures, and leadership in coping with new situations (Donaldson, 2020). These conclusions are supported by the results of the current study on the collaboration between teachers and headmasters. Teachers supported each other in both planning and implementing teaching. The collaboration took place either in existing groups or in groups that formed spontaneously during distance education. However, some teachers did not take part in collaboration. Teachers' feelings of safety and trust in their work amid a chaotic state could be achieved by clear guidelines and the encouragement and accessibility of headmasters. Uncoordinated, unclear, and inaccessible leadership was an issue that added to teachers' insecurities and hampered their work.

The results of this study on home-school collaboration generally affirm earlier results (Karvi, 2020) regarding the impact of the parents' role but also highlight teachers' willingness to support parents and students with distance learning practices and tools. Teachers supported parents by striving to communicate clearly about timetables, ways of working, and tasks. Teachers also provided personal support to some parents in adopting tools and programs used in distance education. Both teachers and parents guided and supported students in adopting new ways of going to school, doing assignments and taking up digital technologies.

Distance learning enablers

Teachers made use of digital technology both in their teaching and in their collaboration with students, parents, and colleagues. Online meeting and learning platforms available at municipalities and schools, self-made or publisher materials, and especially official and informal instant message platforms were utilised in teaching and interaction. Concerns about data security and age limits were brought up. There were also discussions regarding the rules, directions, and usability of tools and programs. The shift to distance education brought out issues

regarding equality in digital equipment availability identified in earlier studies (Ahtiainen et al., 2020; Karvi, 2020; Tanhua-Piiroinen, 2019).

Our research results confirm findings from previous Finnish studies on teachers' competences (Tanhua-Piiroinen, 2019). In our results, teachers' digipedagogical competences vary from weak to expert-level. The weak competences may be due to some teachers still having negative attitudes toward digipedagogical professional development. In contrast, the forced distance learning period has made teachers aware of the digipedagogical competence level of other teachers and led them to appreciate the importance of digipedagogical competences and reconsider their prejudices. The forced pedagogical trials made during this period assured teachers of their ability to learn and utilise technology to support teaching and learning quickly. Such a crisis situation calls for teachers' responsibility in learning digipedagogical competences, as Tirri (2018) points out when emphasising the demands for autonomous teacher's ability for continuous learning and reflection on professional attitudes.

The distance education period brought out not just the digipedagogical skills and attitude related to technology use but also teachers' ability to act as innovators. In the Finnish context, this ability is especially made possible by the pedagogical autonomy of teachers (Tirri, 2018). The mere availability of digital tools and programs and the presence of digital and pedagogical skills (Mishra & Koehler, 2006; Tanhua-Piiroinen, 2019, 2020) is not enough to foster innovation. In these results, teachers exhibited creativity, problem-solving skills and innovative work behaviour (Fullan 2015; Messmann & Mulder, 2014; Rogers, 2003) when facing challenges in organising distance education. This also relates to Vivitsous' (2019) discussion on hybrid education and digitalisation in the educational context, where it is noteworthy that teachers had to be able to 'in situ' adapt and innovate their virtual and face-to-face classroom practices in the ongoing situation in real time (Vivitsou, 2019). Through creating new ways of working and using technology, some teachers report getting excited about their work again. Some report enjoying solving the arising challenges. The co-development, ideating, and planning of teaching among teachers emphasised by Flynn (2020) plays a significant role here. The results point that the continued use of ideas and co-development models created during distance education may also be important in further school development after the distance education period.

As a summary of the case study results, it can be said that by adopting the holistic view from the Innovative School model of all school actors, including teachers, students, headmasters, and parents (Korhonen & Lavonen, 2017), we find that all of these actors played a role in the adaptation of the school's complex system to a forced externally imposed change. Teacher-made

decisions aligned with CAS-theory (Mitleton-Kelly, 2003; White & Levin, 2016), being based on teachers' own history and circumstances in interaction with headmasters, students, and parents. The decisions led to diverse practices in teaching and collaborating in different areas in Finland, also influenced by available tools and programs and their usability, teachers' digipedagogical competences, and teachers' individual and collaborative innovating skills.

Conclusion

Early published reports and studies on the Finnish Covid-19 distance learning period primarily describe the effects of distance education on schoolwork, teaching and wellbeing, as well as providing themes for best practices. This study adds a teacher-centred view to the discussion by giving an in-depth and diverse description of everyday practices and enablers. The study also highlights the multifaceted role of digipedagogical and innovation competences in the changing educational context.

Finnish teachers were able to cope with the Covid-19 situation by drawing upon both their high-level pedagogical skills and ability to create innovative solutions new to their practice using available devices, software, services, and materials. The teachers were also willing to guide and support both students and parents during this exceptional period. Teachers with weaker digipedagogical skills were forced to fill in skill gaps through self-study and peer support.

In light of the levels of digitalisation defined by Barras (1986, 1990) and considering the definition of digitalisation by Tilson et al. (2010), we can say that teachers were primarily digitising existing face-to-face teaching, acting on the first level of digitalisation with their efforts to re-implement school in a distance education setting. Following Vivitsous' (2019) discussion on hybrid learning environments, reaching 'spaces where different voices speak in a coherent manner in order to work jointly for shared solutions' (p. 126) has yet to be accomplished. This is reasonable given the need for sudden change and socio-emotional strain because of the pandemic; nevertheless, some teachers took a different approach and designed new practices based on the new possibilities offered by digital technology. In doing so, they were trying from the start to digitalise school practices, working on higher levels of pedagogically meaningful digitalisation.

To allow more teachers to continue the pedagogically meaningful utilisation of digitalisation of school practices in preparation for post-Covid education and draw on the inherent motivation to do so arising from their Covid-19 experience, more teachers must acquire better digipedagogical competences

(i.e., competences that link together technological prowess with the ability to apply and innovate in the now blended school context). We recommend that the results of this study portrayed as the practices and enablers of distance education would be utilised when planning for post-Covid education. All stakeholders involved in school development should be included in envisioning and implementing future classroom practices of innovative post-Covid-19 schools (Korhonen & Lavonen, 2017). The autonomous role of Finnish teachers made innovation possible in these circumstances; however, not all teachers could meet these requirements. Future plans need to consider how to support schools and teachers in changing realities so that teachers with different competence levels working in different educational cultures can implement quality classroom learning and interaction practices. In practice, digitalisation work will need school organisations that foster collaborative development (Donaldson, 2020; Flynn, 2020) and teachers with a positive attitude towards and personal responsibility for their skill development. Thurlings et al. (2015) point out that the teachers' possibility to innovate, utilise new solutions in their work and share these practices with other teachers depend on, in addition to individual and organisational factors also on external factors like curricula and policies. Curriculum and educational policies may, in some cases, hinder innovation. However, the authors state that educational policies can convince teachers to take steps toward innovations instead of preventing them when pointed in the right direction. We agree with this recommendation and suggest planning supportive measures for post-Covid-19 innovative work of teachers on the national, municipality, school, and teacher levels.

The present study's limitation is the small number of interviewed teachers, but the strength is that participants represent new and experienced teachers, from upper and lower primary schools of different sizes and from different parts of Finland, providing a balanced view of school practices and their enablers. This study provides a good foundation for studying school practices affected by Covid-19 and confirming previous research results regarding the need for innovative work of teachers. Further studies are required to examine how the novel practices innovated during distance education are applied and disseminated in schools currently and in the future. Further studies are also needed on teachers' innovative digipedagogical competence development – they should not be limited to assessing current competence levels but also focus on finding key factors that support or hinder the development of such competences for individual teachers and the whole school community.

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Lost Trust? The Experiences of Teachers and Students during Schooling Disrupted by the Covid-19 Pandemic

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This paper aims to help understand how relational trust between students and teachers embedded in the teaching-learning process unfolded during the emergency distance and flexible hybrid education in Serbia in 2020. It also identifies niches in student-teacher relationships that hold potential for repairing and building trust. For the student-teacher relationship to be trust-based and thus conducive to students' learning and wellbeing, a consensus about role expectations must be achieved. As the Covid-19 crisis interrupted schooling and education, participants faced uncertainties and ambiguities in role enactment, and the cornerstones of relational trust were disrupted. In an effort to understand 1) the context in which trust was challenged, 2) the ways in which trust was disrupted, and 3) the opportunities for its restoration, we relied on a multi-genre dynamic storytelling approach to data collection and values analysis for data processing. A total of 136 students and 117 teachers from 22 schools wrote 581 narratives in three genres: stories, letters and requests. The analysis yielded 22 codes that allowed further understanding of how changes in structural and institutional conditions affected both students' and teachers' expectations of each other, and how incongruence of these expectations fed into feelings of helplessness for both students and teachers, disengagement from learning for students, and heavy workload and poor performance for teachers. In addition, the narratives account for positive outcomes when these expectations were met, and for opportunities for trust-building if students' and teachers' perspectives are brought to each other's attention and negotiated locally. Finally, recommendations for restoring trust are given.

Keywords: disruption of relational trust, remote and hybrid education during the pandemic, dynamic storytelling, analysis of narratives, students' and teachers' perspectives

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Izgubljeno zaupanje? Izkušnje učiteljev in učencev med šolanjem, ki ga je prekinila pandemija covida-19

Tijana Jokić Zorkić, Katarina Mićić and Tünde Kovács Cerović

Namen prispevka je pomagati razumeti, kako se je odnosno zaupanje med učenci in učitelji, vgrajeno v proces poučevanja in učenja, razvijalo med izrednim izobraževanjem na daljavo in prilagodljivim hibridnim izobraževanjem v Srbiji leta 2020. Opredeljuje tudi situacije v odnosih med učenci in učitelji, ki imajo potencial za obnovo in krepitev zaupanja. Da bi odnos med učencem in učiteljem temeljil na zaupanju ter tako pripomogel k učenju in dobremu počutju učencev, je treba doseči soglasje o pričakovanjih glede vlog. Ker je kriza covida-19 prekinila šolanje in izobraževanje, so se udeleženci spoprijeli z negotovostjo in dvoumnostjo pri uveljavljanju vlog, porušeni pa so bili tudi temelji odnosnega zaupanja. Da bi razumeli kontekst, v katerem je bilo zaupanje postavljeno pod vprašaj, načine, na katere je bilo porušeno, in priložnosti za njegovo ponovno vzpostavitev, smo se pri zbiranju podatkov oprli na večvrstni pristop dinamičnega pripovedovanja zgodb, pri obdelavi podatkov pa na analizo vrednot. Skupaj 136 učencev in 117 učiteljev iz 22 šol je napisalo 581 pripovedi treh vrst: zgodbe, pisma in prošnje. Analiza je dala 22 kod, ki so omogočile nadaljnje razumevanje, kako so spremembe strukturnih in institucionalnih pogojev vplivale na medsebojna pričakovanja učencev in učiteljev ter kako se je neskladnost teh pričakovanj odrazila v občutkih nemoči pri učencih in učiteljih, neudeležbi pri učenju pri učencih ter v veliki delovni obremenitvi in slabi učinkovitosti pri učiteljih. Poleg tega pripovedi opisujejo pozitivne rezultate, ko so bila ta pričakovanja izpolnjena, in priložnosti za krepitev zaupanja, če se na stališča učencev in učiteljev opozori ter se o njih pogaja na lokalni ravni. Na koncu so podana priporočila za ponovno vzpostavitev zaupanja.

Ključne besede: prekinitev odnosnega zaupanja, izobraževanje na daljavo in hibridno izobraževanje med pandemijo, dinamično pripovedovanje zgodb, analiza pripovedi, stališča učencev in učiteljev

Introduction

The year 2020 was exceptional for education systems globally. The Covid-19 pandemic led to unprecedented disruptions in schooling around the world (Bertling et al., 2020), which exacerbated already known education policy fractures and put the quality, equity and effectiveness of education at risk (Schleicher, 2020). It forced school closures, the introduction of emergency distance education, and experimentation with various hybrid and blended educational models, thus leaving more than 1.5 billion children temporarily out of school (UNESCO, 2020a) and exposing all education participants to an incommensurable degree of uncertainty and ambiguity (Bergdahl & Nouri, 2020; Gudmundsdottir & Hathaway, 2020; Hodges et al., 2020; Trust & Whalen, 2020).

Teachers were at the forefront in the abrupt change in their everyday practice (Reimers & Schleicher, 2020). The dissolution of the education setting, their professional role and their work habits are all potential high stressors for teachers (Kim & Asbury, 2020). Teachers were the first to face the challenges of technological, content, pedagogical and monitoring readiness (UNESCO, 2020a), all subsumed in conducting distance education. In doing so, teachers' basic psychological needs for autonomy, competence and relatedness were jeopardised (Kim & Asbury, 2020). They were coping with a multitude of new requirements under conditions that stripped them of feedback from students and drove them to a high risk of burnout (Hargreaves & Fullan, 2020). At the same time, teachers were also citizens, facing the same dilemmas, threats and anxiety as everyone else, and overseeing the home schooling of their own children while enacting their school-teacher role. Nevertheless, teachers' positive experiences were also detected, such as "increased flexibility in learning and teaching, more opportunities for differentiation in lessons, and increased efficiency in working, teaching, and learning" (van der Spoel et al., 2020, p. 629). Teachers also reported transformative experiences of finding a way out of uncertainty (Kim &Ashbury, 2020), discovering that "schooling is about much more than learning" (Moss et al., 2020, p. 4) and understanding the socio-emotional needs of students and the community both during school lockdown and in discovering how to deliver a blend of physical and remote teaching (Moss et al., 2020).

Students' experiences are less often documented. Especially concerning was the fact that at least one third of students globally were excluded from distance education (UNICEF, 2020). Many studies point to the consequences of unequal access to distance education in terms of losses in students' learning and wellbeing (Bertling et al., 2020), and consequently to potential long-term lapses in countries' economic development (Hanushek, 2020). Mostly studies

focusing on students' mental health and wellbeing have been conducted thus far, pinpointing emerging behavioural problems (Loades et al., 2020; Orgiedes et al., 2020), while students' experiences of the learning process in the context of school lockdown are still rare. Studies that include students portray the educational hardships they face in distance education as well. For example, Niemi and Kousa (2020) report how the tasks and requirements reaching the students were felt as demanding and overwhelming throughout several weeks, while teachers did not register or acknowledge the burden students felt. Distance education can also trigger reliance on student self-regulation and self-motivation (Kovacs Cerović et al., 2021), but not if students are without adequate support (Černe & Jurišević, 2018).

The disruption and transformation of schooling elicited strong reactions from all education participants. The medical threat and feelings of frustration and/or exploration regarding the new situation had the potential to strongly unite teachers and students and create a strong transformational partnership in facing and overcoming the hardships. On the other hand, the isolation and remoteness resulting from school closure and stress had the potential to move the participants in quite the opposite direction. The disruption also created new niches to explore how the education process twists, transforms or deteriorates in unforeseen ways and gets reinterpreted and (hopefully) reconstructed by the education participants.

Relational trust

According to Bryk and Schneider (2002), relationships between teachers and students, teachers and other teachers, teachers and parents, and between all of these actors and the principal, are characterised by mutual dependencies in the effort to achieve desired outcomes. These dependencies are attached to school actors' understanding of the roles and obligations of others, as well as to expectations they hold of each other. Therefore, for a school community to be successful, a consensus about roles, obligations and expectations must be achieved in all role relationships.

Such relational trust is grounded in *respectful exchanges* between school actors, genuine listening and taking others' views into consideration in subsequent actions, which make all school actors feel valued and respected. *Competence* in core role responsibilities is what produces desired outcomes and thus meets others' expectations. Moreover, holding each other in *personal regard* discerns trust as it spurs from the willingness of actors to enact more than just what the professional role requires (e.g., openness to others). In addition, perceptions

about *personal integrity* (e.g., keeping one's word, moral-ethical perspective) affect school actors' judgments of trustworthiness (Bryk & Schneider, 2002).

Benefits of relational trust

An abundance of research results demonstrate multiple benefits of relational trust in the context of educational changes, school improvement and student achievement and wellbeing.

Relational trust is at the core of teachers' experience of educational change (Bryk & Schneider, 2002; Cranston, 2011). Trust-based relationships with colleagues and principals make professional learning communities adapt to the continuously changing demands (Cranston, 2011; Tschannen-Moran, 2009), while teachers' perceptions of personal integrity (Louis, 2007; Tschannen-Moran & Gareis, 2015) as well as their perception of the professional competence of change administrators influence teachers' willingness to take risks and to test untested hypotheses (Bryk, 2010; Tschannen-Moran, 2009).

Collegial trust among teachers has also proven to influence teachers' commitment to students (Lee et al., 2011); the collaborative community provides opportunities for teachers to share experiences, ask for support and get feedback from colleagues, which in turn enhances their efficacy on instructional strategies and student discipline.

Consequently, students benefit from teachers' trust and their achievements are likely to increase, even in poverty-stricken schools (Goddard et al., 2001; van Maele & van Houtte, 2011). Moreover, students' sense of wellbeing strengthens when schools encourage and promote authentic forms of students' voices that warrant students' psychological and emotional involvement in schooling (Smyth, 2006).

Students also benefit from their own trust in teachers in terms of learning and achievement (Goddard et al., 2001; Goddard, 2003) as well as prevention and mitigation of discipline problems (Gregory & Ripski, 2008); when students are confident in their expectation that teachers act reliably and competently, their engagement within the learning processes is higher.

However, relational trust is moderated by contextual factors. A history of untrustful role-relationships within a school community is a barrier to the development of relational trust in the present. Institutionalised mistrust, such as negative long-term experiences with school leadership (Tennenbaum, 2018) or distrust in the system in general (Louis, 2007), prevent the establishment of relational trust between education participants.

Another moderator of trust between school actors is the positional power they bear. In other words, more powerful actors hold trust for others based

on the perceptions of their competence, while more dependent actors give trust based on perceptions of more personal characteristics (Weinstein et al., 2018). For example, teachers' trust in students is associated with their perceptions of the students' ability to meet their expectations, while students' trust in teachers is predicted by their experiences of trust teachers attribute to them (van Maele & van Houtte, 2011).

The Covid-19 crisis and relational trust

Relational trust becomes even more important in times of crisis, such as the Covid-19 pandemic, as the risks are greater and the stakes are higher (Myung & Kimner, 2020). Relational trust between school actors embedded in the culture of safety and respect is therefore of utmost importance for organised, quick and effective change, as it is conducive to the participants' resilience and school improvement (Myung & Kimner, 2020).

To the best of our knowledge, research on relational trust in the context of the Covid-19 crisis does not yet exist. However, appeals for its establishment and maintenance, throughout school closure and especially during school reopening, have been noted. Myung and Kimner (2020) call for shared purpose, mutual trust, structures and resources that foster collaborative work. Viner et al. (2021) advocate health and protection protocols that maintain the trust of teachers, students and the public in education institutions. Darling-Hammon and Hyler (2020) appeal to policymakers to develop strategies that support educators in meeting the socio-emotional and academic needs of students (e.g., supporting mentoring and the development of new teacher roles, and creating time for educators to collaborate with each other and key partners).

Education during the pandemics in Serbia

During the 2020 pandemic, Serbian schools used two different approaches. As in many other countries in Europe and worldwide (UN, 2020), full school closure with distance education started in mid-March and lasted until the end of the school year. In autumn, a flexible hybrid approach was introduced, combining contact instruction (albeit with reduced hours and class size) with distance learning, allowing schools to design the option that fitted their students' needs and school capacities best, and allowing parents to individually choose the type of instruction they preferred for their child. The two approaches to schooling were not only different in organisation, but were also embedded in two different contexts. In spring, a six-week state of emergency with a major lockdown and a harsh curfew was enforced in parallel with school closure,

while autumn brought a return to near normal organisation of life, albeit with social distancing, masks and no nightlife. Distance education during the school closure and as part of hybrid education included a combination of low-tech and high-tech tools from the UNESCO suggested list (UNESCO, 2020b), such as TV instruction, Viber groups, email, Messenger, Google Classroom, Google Meet or Zoom, but occasionally also no-tech solutions of providing printouts for parents or students to pick up at the school entrance.

Research goals and questions

Given the pricelessness of relational trust in times of crisis and the dynamics of education provision in Serbia during 2020, we wondered how teacher-student interactions unfolded and what expectations were involved. Did the transformed education process instil relational trust and trust in education itself, or did it challenge it?

This paper puts the spotlight on the intricacies of the teaching-learning process and the relational trust embedded in it from the perspective and through the experiences of schoolchildren and teachers during the school closure and reopening in Serbia in 2020. The paper aims to help understand how relational trust between students and teachers was unfolding, distilling, diminishing, or reconstructing itself during emergency distance and flexible hybrid education experienced.

The research questions that guided this research endeavour are:

1. How did students and teachers experience distance and hybrid education?
2. Was trust disrupted and, if so, how?
3. What are the opportunities for repairing and strengthening relational trust in this challenging context?

Method

As the aim of our study called for exploring nascent experiences saturated with feelings and search for meaning, we selected a narrative methodology that utilises the dynamic storytelling approach (Daiute & Kovač-Cerović, 2017) as a data collection framework, and Values Analysis (VA) (Daiute, 2013; Daiute et al., 2020) as a type of qualitative analysis that fully respects the narrators' stances. This analysis builds on the understanding that narration is a communicative act and that narrative expressions communicate messages and meanings that the narrator chooses as important and valuable to share. Therefore, VA

does not refer to the social-psychological notion of value, but to the communicative value of a message. Furthermore, guided by our interest in delving into the intricacies of the interactions between key education participants, we opted for multi-genre narratives. As prior research has proven (Daiute & Kovač-Cerović, 2017), different narrative genres provide opportunities for narrators to relate to different actual or imagined audiences with dynamic, different and even contradicting stances and voices, thus enriching the perspectives conveyed.

Data collection: Instrument and procedure

We constructed an online instrument containing prompts for narratives and basic group identifiers. The prompts for both teachers and students were designed to elicit narration in two different genres: in the form of a story about schooling in the altered conditions, and in the form of a letter to a peer who is about to face schooling in altered conditions. We additionally prompted students to narrate in a request genre by writing about what they would like to be different in the current schooling conditions.

Both instruments were disseminated online to schools in two waves: first in June 2020, during the lockdown and distance education only, and several months later, in December 2020 and January 2021, when education was organised in a flexible hybrid model. In both waves, links to online instruments were distributed via school management and participation was voluntary.

Sample of participants and narratives

A total of 136 students and 117 teachers from 22 schools completed the questionnaires in two waves. In the first wave (June 2020), 45 students (64% female, average age 14.3) and 59 teachers (94% female, average work experience 15.9 years) took part in the study. In the second wave, another 91 students (59% female, average age 11) and 58 teachers (85% female, average work experience 15.5 years) participated in the research (no first-wave participants took part in the second wave of data collection). The participants wrote a total of 581 narratives. Table 1 shows the sample of narratives per wave, subsample of participants, and narrative genre.

Table 1
Sample of narratives per wave, subsample of participants, and narrative genre

Distance learning	Students			Teachers		213	581
	Stories	Letters	Requests	Stories	Letters		
	36	30	39	54	54		
		105		108			
Hybrid model	Students			Teachers		368	
	Stories	Letters	Stories	Letters	Stories		
	79	87	89	57	56		
		255		113			

Analysis

The narrative materials were segmented into thought units, usually consisting of one sentence per unit, which were coded. A coding manual was developed after the first wave of data collection. Three researchers collaboratively read a sample of materials to identify the organising principles and important messages, i.e., "values" communicated through each unit, and to assign codes and then fine-tune the coding system on another sample of materials. A sample of the narratives from the second wave was used to adjust the coding manual to newly emerged values. Prior to final coding, a reliability check was carried out. Cohen's Kappa coefficient showed a strong agreement between two coders ($\kappa = 0.82$, $p = .000$), who further coded the materials from both waves.

Results

A total of 2,346 thought units were coded with 22 codes, subsequently grouped into two broad themes: context and trust. The context theme is organised around codes that refer to the experiences of conditions set by the pandemics during distance and hybrid education, while trust is thematised through codes representing relations, perceptions and evaluations of self and others, around which trust is devised.

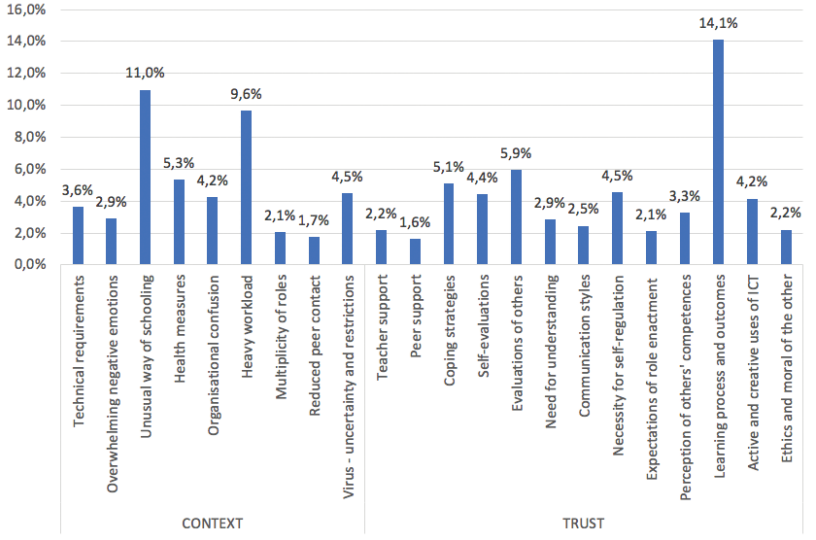
The distribution of the 22 codes in the complete sample of coded thought units (across both stakeholders and both waves of data collection) is shown in Figure 1. The three pivotal codes emerging from students' and teachers' narratives, regardless of the education model, are *Learning process and*

outcomes (14.1% of all coded units), *Unusual way of schooling* (11%), and *Heavy workload* (9.6%), while eight codes are distributed with frequencies close to 5%, and another eleven with lower frequencies, all calling for further detailed analysis.

The detailed meaning and content of all of the codes within the two themes is described in the next section, where answers to the research questions are presented. Distributions of codes by stakeholders and education models for context and trust are shown in Figures 2 and 3, respectively.

Figure 1

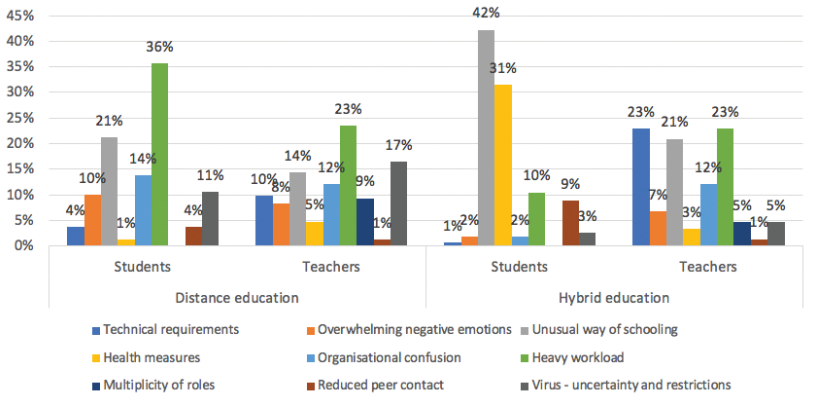
Distribution of coded thought units across two broad themes (Characteristics of context, and Dimensions of trust)



1. *How did students and teachers experience distance and hybrid education?*

Figure 2

Distribution of codes within Context across research participants' narratives and waves of data collection



Both students' and teachers' narratives most frequently point to the heavy workload during distance education (Figure 2; code: Heavy workload; 36% of units in students' narratives and 23% of units in teachers' narratives), and how unusual (code: Unusual way of schooling) and confusing (code: Organisational confusion) it was. Students' expressed that they were overwhelmed with homework, and that too many different online platforms had to be used, which made it impossible to keep up with all of the teachers. One student summed this up as follows: "every week is more challenging than the other, every assignment harder than the previous, every piece of homework bigger, and all that without teachers to help you" (student Marija). Similarly, teachers described a surplus of obligations resulting from unclear top-down guidance, unequal outreach to students, and their lack of digital skills. One teacher portrayed this period as a "virtual darkness with no access to feedback of any kind" (teacher Vesna). Additionally, many teachers struggled to balance two very important roles (code: Multiplicity of roles) – teacher and parent – and, more frequently than students, they narrate about the anxiety caused by contradictory discourses about the virus (code: Virus – uncertainty and restrictions). Both students and teachers faced many technical problems: lack of equipment or outdated equipment, poor internet connection, sharing ICT devices with siblings and family (code: Technical requirements).

School reopening and the transition to a hybrid model of schooling was less demanding and confusing for students, similarly demanding and confusing for teachers, but significantly more unusual for both (Figure 2): "this hybrid model makes no sense" as one student said (student Borko). Unusual and ambiguous students' experiences are related to the restrictive health measures (code: Health measures) of in-person instruction (e.g., short in-person lessons and half-empty classrooms), and to the mismatch between TV lessons and school-based work (code: Organisational confusion), which all somehow conveyed a lack of much needed contact with peers and teachers (code: Reduced peer contact). For teachers, this model triggered feelings of "helplessness in a controlled chaos" (teacher Slavica).

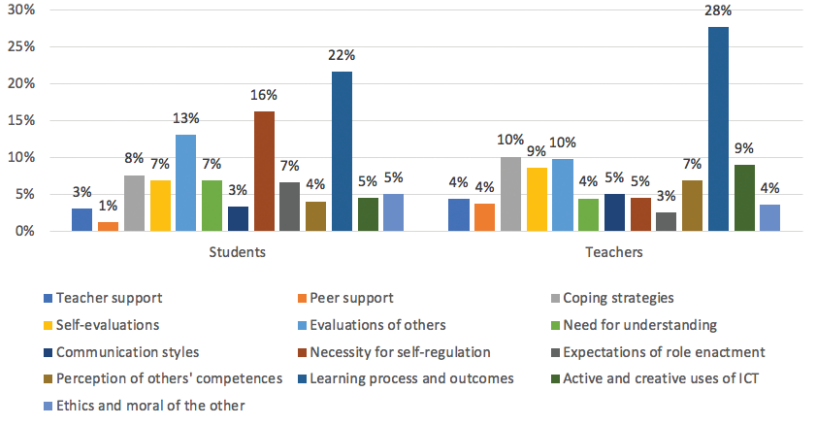
These results show that the transition to distance teaching as well as the hybrid model of education brought many uncertainties and ambiguities in the enactment of students' and teachers' roles (Figure 2; code: Overwhelming negative emotions).

2. *Was trust disrupted and, if so, how?*

The narratives describe how all four core dimensions of trust in student-teacher relationships were disrupted: competence, respect, personal regard and integrity (Bryk & Schneider, 2002). In this section, we describe students' accounts of student-teacher relationships in relation to the four trust cornerstones and contrast them with teachers' views.

Figure 3

Distribution of codes within Trust across the research participants' narratives



Competence

This is the most elaborated dimension of trust by both students and teachers and can be traced through 7 out of 13 codes: Coping strategies, Self-evaluations, Evaluations of others, Necessity for self-regulation, Perception of others' competence, Learning process and outcomes (a code prominent in all subsamples), and Active and creative uses of ICT.

Students refer to the quality of distance and hybrid education (Figure 3, code: Learning process and outcomes), the (in)competence of teachers (code: Perception of others' competence), the need for self-regulation of learning (code: Necessity for self-regulation), and to much needed creative uses of ICT in education (code: Active and creative uses of ICT). They assess the changed schooling as not very effective, as they generally felt "less actively involved in learning" (student Alisa), and perhaps even more so in hybrid education. The incompetence of teachers is seen through underused features of digital platforms, applications and video chats. On the other hand, they describe cases of teachers' creative uses of ICT that helped them learn, develop new skills and feel good about education (codes: Active and creative uses of ICT and Self-evaluations).

The code Learning process and outcomes in teachers' narratives is most frequently elaborated in terms of the equity of distance education as well as their own contribution to this dimension. For example, they explain how unequal students' participation was due to the unequal distribution of resources, and how now more than ever it was important for teachers to get to know their students, to praise their work and engagement, to find ways to motivate them, and to make careful and creative choices about teaching methods and learning materials. Additionally, teachers speak about their digital (in)competence (codes: Coping strategies, Self-evaluations, Active and creative uses of ICT): how the digital environment is unfamiliar to them, how collegial exchanges helped them find their way around digital platforms, how they need to further develop digital skills, how (un)creatively they used digital technologies, and why they should be used more in the future.

Some narratives illustrate how organisational, technical and logistical day-to-day problems prevented teachers from responding to students' needs on time and from devoting themselves more to capacity building (codes: Necessity for self-regulation, Coping strategies): "each time you think you're on the right track, you know that an incoming instruction from the Ministry will push you into a ditch" (teacher Borjana).

Respect

Students' and teachers' accounts of mutual respect differ in their focus. Students point more frequently to disruptions, while teachers also elaborate their efforts to establish caring exchanges. Codes that inform understanding of respect are Need for understanding and Communication styles.

The sources of disruption pointed out by students are similar across time (distance and hybrid model). Disruptions occurred when teachers expressed anger, resentment or lack of patience (Figure 3, code: Communication styles, e.g., when homework was not submitted on time) or when they expressed demands that the students perceived as beyond their capacities (code: Need for understanding, e.g., long tests in a very short time). In their narratives, students asked for more understanding and patience, and a better mood from teachers, as "some teachers are more hostile than before" (student Nenad). The notions of disrespect in communication found in the students' narratives may indicate disruptions in this dimension (code: Communication styles): "If students don't respect you, this is because you disrespect them" (student Lena).

Teachers narrate about attempts to find ways to include all students in daily exchanges, especially at the beginning of lockdown, to maintain caring communication, to show understanding, to convey the importance of mutual support, and to teach them empathy (codes: Communication styles and Need for understanding). Teachers also suggest how respectful communication on the part of students is lacking (code: Communication styles) – politeness, nice behaviour, discipline, listening to what teachers are saying – which is mostly related to behaviour during lessons. However, teachers' considerations of respectfulness of their own communication related to instruction or assessment were not noted.

Personal regard

Students and teachers do not talk explicitly about the willingness of others to enact more than what their roles require. However, this can be understood through codes such as Teacher support, Peer support, Expectations of role enactment, and Communication styles.

Students thus talked about the readiness of teachers to support them in resolving the same problems repeatedly, and about their availability for communication at all hours (Figure 3, code: Teacher support): "The good thing is that our teacher did his best to explain the lesson before and then again after the test" (student Neda).

Some teachers describe their perception of students' responsibility (code: Expectations of role enactment). In doing so, they refer to their expectations

that education should have been the students' priority during the pandemic, and that students should be motivated and have working habits. It was therefore especially rewarding for teachers when students, despite all of the obstacles, succeeded in responding to all of the assignments and in staying motivated throughout the lockdown, while their failing to live up to these expectations made teachers feel less valued and respected: "I feel bad and helpless because children won't turn their cameras on during lessons and they cheat with homework" (teacher Dara).

Personal integrity

Perceptions of personal integrity are also related to instruction and assessment in both the students' and teachers' narratives, and are highlighted through the code Ethics and moral of the other. Almost all notions refer to experiences during school closure and distance education.

Students speak of a difference in power positions and point to times when "some teachers make claims and act inappropriately, just because they can" (student Veljko), which they see as unjust. In turn, they tend to withdraw from interaction and to meet only minimum requirements for that particular subject.

Teachers note the unethical conduct of students, such as family members doing the homework instead of students or students making up unrealistic excuses for their absence in online education. One teacher stated that they have been assessing "moms, dads, older siblings, good aunts and helpful neighbours" (teacher Bojana). This was very challenging for teachers, as they had to intensify communication with parents, who negate such behaviours, while at the same time trying to avoid negative assessment in order to prevent adding burden and negative feelings in already hard times.

3. What are the opportunities for repairing and strengthening relational trust?

Although the results presented thus far point to disruptions of all four cornerstones of trust, niches that safeguard opportunities for repairing trust between students and teachers are registered too.

Similarities and differences in the discernment of codes that are relevant to relational trust across students' and teachers' narratives can be noted across waves. During school closure, comparable discernment through the narratives was found in relation to Learning process and outcomes (about 20% of the coded units in students' and teachers' narratives). During hybrid education,

however, teachers' accounts of Necessity of self-regulation become more frequent, thus approaching its distribution in students' narratives (about 10% of the coded units). Similarly, the frequency of students' accounts of Coping strategies came closer to its distribution across teachers' narratives in the second wave (hybrid education).

These niches hold potential for restoring trust if they are brought to the attention of and negotiated by students and teachers.

Commitment to learning goals and outcomes should be negotiated

Caring communication on the part of teachers and openness towards providing socio-emotional and learning support makes students feel more comfortable and safer in times of crisis and strengthens their confidence in teachers' devotion to students' advancement. For example, students' words such as "we are not going to bother you… please don't get angry with us… it hasn't been a month since we started school… I hope we will get on with each other well" (student Marko) or "don't get angry with us if we don't complete assignments on time, not all of us have equal access to online platforms" (student Jovana) can be translated into teachers' notions such as "we should have in mind that some students are not digitally competent and that they need more support… also, not all students have equal access to online teaching… be patient because they will ask for support a lot!" (teacher Fatima).

Expectations of role relationships should be agreed

Students' demands for creative uses of online platforms and digital technologies by teachers, as this actively engages them in learning, should be met with understanding and competence by teachers. As one teacher explained: "Don't expect students to be online every day at the same time. They should learn at their own pace. Set realistic deadlines. Give new assignments on particular days, not every day, and choose them according to the outcomes you want to achieve… take kids to virtual museums… enjoy students' work and products…" (teacher Sofija).

On the other hand, students' owning the responsibility for their own learning and ethical conduct leverages teachers' trust and commitment to students. Some students explained how distance learning was not too hard, as they "followed certain rules during the whole semester: behave respectfully towards teachers, actively participate in lessons, and study regularly" (student Milica).

Discussion and policy recommendations

In this section, we discuss the meaning and significance of the results in light of prior research on relational trust. In addition, we relate the results to considerations of systemic measures that can contribute to trust building between students and teachers.

Discussion

This research described how relational trust between students and teachers – as defined by Bryk and Schneider (2002), i.e., consensus about roles, obligations, and mutual expectations – became ruptured during the emergency distance and hybrid education in Serbia in 2020.

Firstly, our data bears witness to the manifold challenges for the enactment of both students' and teachers' roles created by the transition to distance and hybrid education. Students narrate about overwhelming amounts of homework and negative and ambiguous emotions, while teachers speak about a surplus of obligations and feeling of helplessness. At the same time, they all encounter numerous technical problems. Similar experiences were noted in other research that included students and teachers during the Covid-19 crisis: losses in wellbeing, feeling of belonging, and confidence in their competences (Bertling et al., 2020; Kim & Asbury, 2020; Niemi & Kousa, 2020; Trust & Whallen, 2020).

The fear and uncertainty that everyone faced needed to be mended and overcome through peer, collegial and teacher-student exchanges. However, as our findings suggest, trustful social exchanges were rarely available to students and teachers. All four cornerstones of relational trust were compromised during the period of distance and hybrid education: competence, respect, personal regard and integrity (Bryk & Schneider, 2002).

Students described how a lack of confidence in teachers' competences diminished relational trust. They assessed that teachers' underdeveloped competences in the online environment negatively influenced students' engagement in meaningful learning, much as has been found in the case of face-to-face instruction (e.g., Goddard et al., 2001). Moreover, teachers' abuse of their power position (lack of personal integrity) negatively affected students' trust in teachers: students withdrew from interaction and met only minimal class requirements. On the other hand, students described positive emotions and engagement in schooling when they perceived teachers' respectful communication and readiness to support students (respect and personal regard). These

results suggest that when teachers encourage students' expression and psychological and emotional involvement in schooling, students' sense of wellbeing is strengthened (Smyth, 2006), including during education in times of crisis.

For teachers, students' inability to meet the expectations of being motivated and persistent in learning during distance and hybrid education prevented them from holding students in high personal regard and consequently affected relational trust between them. The same happened when teachers perceived a lack of personal integrity among students (e.g., unethical conduct) or disrespect in communication (e.g., impoliteness). According to the literature on relational trust (van Maele & van Houtte, 2011; Weinstein et al., 2018), teachers' divulging trust to students based on the perception of their competence is a common feature of contact instruction, while students more often give trust to teachers based on their personal characteristics (e.g., personal integrity). However, our research showed that both competence and more personal cornerstones of trust, such as personal regard, respect and integrity, are a very powerful basis for trustful role-relationships between teachers and students in times of crisis.

An important finding is how collegial exchanges during this time helped teachers in relation to capacity building and navigating the rapidly changing and overwhelming context. As previous research has shown, horizontal exchange and collaboration correlate with teachers' resilience in times of crisis (Cranston, 2011; Tschannen-Moran, 2009).

The findings also point to how contextual features moderated relational trust (Louis, 2007; Tennenbaum, 2018). According to teachers, the frequent but conflicting top-down demands created a surplus of administrative obligations to be fulfilled within tight deadlines. These tasks often prevented them from responding to students' needs or establishing caring and empathic communication with them. Teachers report knowing that this led to students' disappointment, but they also felt a lack of understanding on the part of students, feelings that altogether jeopardised relational trust.

As other authors have noted, shared purpose and mutual trust (Myung & Kimner, 2020) as well as meeting the socio-emotional and academic needs of students (Darling-Hammond & Hyler, 2020) are conducive to school actors' resilience and school improvement in times of crisis. In line with this, the results of the present research point to opportunities for strengthening the culture of safety and respect in schools, which is profoundly important for the Covid-19 education process. Negotiation of commitment to learning goals and outcomes, as well as consensus on expectations of role relationships, can contribute to students' and teachers' resilience and wellbeing during crisis, students' greater engagement in schooling, teachers' commitment to students, and more positive

overall teacher experience of rapid change. With this in mind, we provide policy recommendations below.

Policy recommendations

Clear and timely guidance from education authorities. According to teachers' narratives, frequently changing and confusing top-down instructions prevailed even during hybrid education. Policymaking should thus establish a clear framework for emergency and remote teaching in terms of goals and outcomes, curriculum, platforms and assessment, with margins for possible directions of changes due to the evolving health situation. Guiding and support sessions and materials for teachers are also needed in order to reduce uncertainty and confusion. In turn, we expect, students' perceptions of teachers' competence and integrity would not be as compromised as they are now (Lee et al., 2011; van Maele & van Houtte, 2011), and their engagement in learning would increase (Goddard et al., 2001; Goddard, 2003).

Building pedagogical digital competences of teachers. Both teachers and students pointed to the drawbacks and benefits of (ill-)prepared instruction, and (un)transparent assessment in distance and hybrid education, in terms of learning outcomes. Well-designed inclusive instruction in the digital environment is related to the culture that teachers build around implementing technology (McMahon & Walker, 2019), which is embedded in the school context and local realities (Kovacs, 2018), as well as in wider societal discourses on digitalisation in education (Vivitsou, 2019). Therefore, capacity building should aim to develop pedagogical skills in the digital environment, formative assessment, and a relational approach to instruction and learning (UNESCO, 2020a), and it should be articulated in horizontal exchange and collaboration within schools, allowing for the exploration of teachers' preconceptions and previous practices of integrating digital technologies into classroom instruction.

Distance and hybrid education should offer opportunities for negotiation of role expectations. This research has demonstrated how a lack of transparent, respectful, timely and meaningful communication left students and teachers unaware of each other's needs and capacities, resulting in learning losses and reduced wellbeing. In order to avoid such negative effects of relational mistrust, education in times of crisis and rapid change should offer frequent opportunities for students and teachers to talk about their positions and to jointly define and plan the education process: defining obligations, establishing rules of conduct, planning course schedules, choosing the time and space for support in learning and socio-emotional support, etc. Negotiation of role-relationships

should be institutionally supported (Louis, 2007; Tennenbaum, 2018) by enabling resources that students and teachers can use as needed (e.g., "learning hubs" for students who struggle with digital learning and lack of interaction during lockdown – Darling-Hammond et al., 2021).

Conclusions

The aim of this paper was to understand why and how relational trust between students and teachers was challenged during distance and hybrid education in Serbian primary schools. Furthermore, it illuminated niches of role relationships that hold potential for repairing and strengthening trust as they emerge from the data, and offered recommendations for trust-building that target students, teachers and policymakers.

The results showed how students expected to rely on teachers to address uncertainties and resolve ambiguities that distance and hybrid education brought, through coordinated instruction at the school level, creativity and diversity of instruction, provision of support for learning, transparent and just assessment, and caring communication. When teachers met these expectations, students narrate about positive learning outcomes and benefits for their well-being; otherwise, they felt overwhelmed, burdened and confused, and narrate about learning losses, etc. Therefore, lapses in resolving uncertainty and ambiguity made students question teachers' competence, credibility, integrity and respect. On the other hand, our research highlighted teachers' experiences in the ruptured education system, their perspectives on relational trust, as well as the structural and institutional conditions that affected their conduct and competence. Considering this, recommendations for trust building suggest raising awareness of both students and teachers about each other's perspectives and their negotiation locally, as well as policy support to create opportunities for trustful student-teacher relationships in the course of emergency distance education and other crises.

Finally, we consider the limitations of our findings and implications for further research. Since the data collection in our study was conducted online, the percentage of narratives obtained from students with limited access to internet and ICT devices is not proportional to the structure of the student body in the chosen schools. Consequently, relational trust of these students and teachers was not well explored. The methodology for future studies on relational trust needs to be more inclusive of students from vulnerable groups. Furthermore, this research did not take into consideration histories of institutional trust and previous accounts of role relationships in the schools from which our sample came, nor

did it consider teachers' experiences of new technologies in education. Therefore, we were not able to discuss their contribution to the current state of role relationships, even though the relevant literature emphasises its necessity.

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Teachers' Perceptions of Assessment and Feedback Practices in Finland's Foreign Language Classes During the Covid-19 Pandemic

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In this paper, we examine how the Covid-19 pandemic affected the quality of teachers' assessment and feedback in Finland's foreign language classes during the remote teaching period in spring 2020. Multifaceted assessment and feedback practices are underscored in Finland's core curricula, forming a focal aspect of learning. Therefore, we studied teachers' perceptions of their assessment and feedback practices at different school levels during the remote teaching period and how they considered the remote teaching period in students' final assessment at the end of basic education. Data were collected through an online questionnaire and analysed using both quantitative and qualitative methods. Most of the 176 respondents felt that assessment and feedback practices were implemented successfully, and the final assessment was realistic and reliable. However, teachers' perceptions were mixed on several issues, and differences were found in the amount and form of feedback between respondents and school levels or what competence demonstration or assignments to count towards the final assessment. In addition, the remote teaching period usually had less influence on students' final grades than the last few months of basic education. The results suggest that more attention should be paid to enhancing feedback practices and connecting with students during remote teaching periods.

Keywords: assessment, feedback, foreign language teaching and learning, remote teaching

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Učiteljevo zaznavanje ocenjevalnih praks in povratnih informacij pri pouku tujega jezika na Finskem med pandemijo covida-19

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V prispevku preučujemo, kako je pandemija covida-19 vplivala na kakovost učiteljevega ocenjevanja in podajanja povratnih informacij pri pouku tujega jezika na Finskem med poukom na daljavo spomladi 2020. V finskih učnih načrtih so poudarjene večplastne prakse ocenjevanja in podajanja povratnih informacij; te predstavljajo osrednji vidik učenja. Zato smo preučevali, kako učitelji zaznavajo svoje prakse ocenjevanja in posredovanje povratnih informacij na različnih ravneh šole v obdobju poučevanja na daljavo ter kako upoštevajo obdobje poučevanja na daljavo pri sklepnem ocenjevanju učencev ob koncu osnovnega izobraževanja. Podatki so bili zbrani s spletnim vprašalnikom ter analizirani s kvantitativnimi in kvalitativnimi metodami. Večina izmed 176 anketirancev je menila, da se prakse ocenjevanja in posredovanja povratnih informacij izvajajo uspešno ter da je končna ocena realna in zanesljiva. A zaznavanja učiteljev glede več vprašanj so bila različna, ugotovljene pa so bile tudi razlike v količini in obliki povratnih informacij med anketiranci in ravnmi šol ter v tem, katere izražene kompetence ali naloge se upoštevajo pri končni oceni. Poleg tega je imelo obdobje pouka na daljavo običajno manjši vpliv na končno oceno učencev kot zadnjih nekaj mesecev osnovnega izobraževanja. Izsledki kažejo, da bi bilo treba več pozornosti nameniti izboljšanju prakse posredovanja povratnih informacij in povezovanju z učenci v obdobjih poučevanja na daljavo.

Ključne besede: ocenjevanje, povratna informacija, poučevanje in učenje tujih jezikov, poučevanje na daljavo

Introduction

This study aimed to investigate how the Covid-19 pandemic affected Finnish language teachers' assessment and feedback practices during the remote teaching period between March and May 2020. More specifically, we examined whether teachers were satisfied with their assessment and the quality, amount, and forms of feedback they gave to their students. We also explored the key content areas on which they focused in their assessment and feedback practices.

Throughout this paper, we use the term 'student' to refer to pupils and students of all ages. Finnish students usually start first grade the year they turn seven. They study for the first six years at the primary school level, after which they continue at the lower secondary school level for three years. In other words, basic education lasts nine years, after which students usually continue their education in either a vocational school or a general upper secondary school for three more years. In 2019, the number of students in basic education was 564,100, 105,200 in general upper secondary education, and 320,100 in vocational education (Statistics Finland, 2021).

In March 2020, because of the massive outburst of the coronavirus in Finland and elsewhere in the world, all the schools in Finland were closed for two months, and teaching was undertaken remotely. Some schools remained open with specific arrangements for students with special needs or for students in Grades 1 to 3 who could not participate in remote teaching. In May, it was decided that students in basic education (Grades 1–9; comprehensive school) would return to contact teaching, and the continuation of remote teaching was recommended for other levels. Teachers had only a couple of days to prepare for this unprecedented change in March 2020. Several inherent issues related to teaching had to be reorganised, such as the teaching itself, assessment, feedback, homework, assignments, projects, support, and communication and contact with students. Fortunately, online platforms are widely used in Finnish schools, which alleviated the transition slightly, especially for older students. However, not all students had laptop computers or other necessary devices at home (Ahtiainen et al., 2020). Furthermore, half of Finland's teachers in basic education have only basic IT skills, and 10% have inadequate IT skills (Tanhua-Piiroinen et al., 2020).

Teachers are expected to give multifaceted feedback to their students, and their assessment practices should be diverse (FNBE, 2016a, 2016b; Vocational Education and Training Act, 531/2017). Feedback is indispensable in language teaching (Mackey et al., 2016) as students can move forward in the

learning cycle with the help of their teachers' feedback (Hattie & Timperley, 2007), and feedback fosters students' motivation (Dörnyei, 2020). Therefore, studying how the remote teaching period affected language teachers' assessment and feedback practices, as well as how teachers considered the final assessment of 9th graders, is instrumental. In this study, we examined teachers' perceptions of the assessment and feedback practices that they used. Peer assessment and self-assessment were excluded from our study. We will first discuss assessment and feedback practices in schools and then continue with an examination of remote teaching and its implementation during the Covid-19 pandemic in Finland. The next sections describe the data and methods of this study and present the results. Finally, we end the article with a discussion about the results and implications for further studies and practices.

Assessment and feedback in schools

In language teaching, assessment is often either summative or formative: the former referring to assessment after the learning process and the latter referring to assessment during the learning process. However, teachers can also use diagnostic assessment at the beginning of the teaching unit to assess the general level of the students (Linnakylä & Välijärvi, 2005). Other terms are also used for summative and formative assessment, such as achievement assessment and progress assessment, as well as assessment of learning and assessment for learning. Even though assessment does not only refer to tests (Purpura, 2016), it seems that Finnish teachers are prone to using more summative than formative assessment (Mäkipää & Ouakrim–Soivio, 2019), and exams, which are typical for summative assessment, are much used in foreign language teaching (Pollari, 2020). However, as noted by Butler and McMunn (2014), all types of assessment are needed in teaching, but teachers should use an ample variety of assessment methods and determine the pertinent assessment methods for each situation (Anderson, 2003). Nevertheless, foreign language teachers do not always know how to implement formative assessment into teaching (Tsagari, 2016).

Feedback is an inherent part of formative assessment. According to a definition provided by Hattie and Timperley (2007), feedback refers to the information given by an agent (such as a teacher) concerning performance or understanding. Feedback is an essential feature of the learning process (Wisniewski et al., 2020). Feedback needs to be clear, accurate, precise, selective, and timely (Butler & McMunn, 2014). Moreover, effective feedback is based on learning goals (Ruiz-Primo & Brookhart, 2018), explains where the student has succeeded and failed (Hattie & Zierer, 2019), and enhances students' self-regulatory capacities (Hattie & Timperley, 2007). In remote teaching, it is also of the utmost

importance to be skilled in providing online feedback as it differs significantly from face-to-face feedback (Leibold & Schwarz, 2015). Thus, feedback, particularly supportive feedback, is a key success factor in online teaching (Simons et al., 2020).

Implementation of remote teaching

Several terms are used for teaching that takes place remotely without the students and teachers physically in the same location. These terms include (but are not restricted to) distance teaching, remote teaching, distance education, open learning, and online learning. Their definitions may be similar or have distinct variations. Remote or distance-based teaching is not a new phenomenon, but with the internet and digitalisation, the conditions for it have gradually changed and improved. According to Simonson and Seepersaud (2019), the definition of distance education includes four components. The first is that distance education is institutionally based (as opposed to self-study), and the second is the separation of teachers and students. They must be separated in different physical locations but may also be separated in time and function asynchronously. The third component is interaction through different forms of telecommunication, such as the internet and a range of online platforms, but it could also be television, telephone, or even postal services. The final component is the interconnectedness of teachers, students, and learning resources (Simonson & Seepersaud, 2019). Distance education has become common in many universities, and many Massive Open Online Courses (MOOCs) are offered – sometimes free of charge – to anyone interested.

Distance education has generally been geared mostly to adults and only recently to school students (Hilli, 2020). Remote teaching has become more common in school education for students in countries that are scarcely populated or in situations in which bullying, safety, or students dropping out is an issue (Toppin & Toppin, 2016). Globally, remote teaching has offered rural schools better opportunities to employ qualified teachers to organise the teaching of less common subjects or smaller groups of students from several schools (Hilli, 2020; Toppin & Toppin, 2016). In Sweden, for example, the government has been allowing the use of remote teaching by using digital technologies since 2015 (Stenman & Pettersson, 2020). However, in Finland, in ordinary circumstances, legislation stipulates that teachers must be present to give students guidance in basic education. Therefore, remote teaching – without an adult overseeing the teaching situation – is not permitted.

Remote teaching, especially synchronous teaching, depends on digital technology, but it also relies on teachers' ability and skill to design and

implement high-quality teaching in digital environments (Stenman & Pettersson, 2020). A guiding principle behind Finnish education is equality (Niemi et al., 2016). Thus, all children should be provided with equal opportunities and access to high-quality education irrespective of their background or where they live. In general, the responsibility for implementing education and educational quality in Finland is held by local authorities (Niemi et al., 2016). Thus, schools (and the teachers) choose the methods and materials for education, including the assessment methods. The Finnish National Agency for Education recommended that schools adopt flexible forms of operation as they prepared the move to special arrangements and remote teaching, to 'aim at deviating from normal operation as little as possible' (Finnish National Agency for Education, 2020). However, as there are several ways to organise teaching in different schools, at different levels, and with different teachers even in ordinary circumstances, the implementations for remote teaching were diverse.

The Trade Union of Education in Finland (OAJ) distributed a questionnaire to teachers at all school levels and received over 5,500 responses in spring 2020. According to the review, most teachers in basic and upper secondary education (about 70%) believed that, in general, the arrangements during the exceptional remote teaching period functioned well (OAJ, 2020). However, not all teachers had computers or mobile phones provided by their employers, and thus they had to use their own. In addition, most upper secondary school students were already familiar with the programmes and platforms they used during the remote teaching period, but this was not the case with many comprehensive school students who had to learn to use these programmes and tools. More than half of the teachers also believed that the remote teaching period would significantly negatively affect individual students and students, although they felt most would fare adequately.

Nevertheless, 75% of the respondents also felt that the remote teaching period would have positive effects on at least individual students, for example, those individuals who have trouble concentrating in a large class. Teaching was not always live online teaching: about 60% of teachers in comprehensive school and 54% in upper secondary school had taught synchronously according to weekly schedules. Students were also given different task packages, either for specific lessons or daily or weekly work (OAJ, 2020).

Another large-scale questionnaire study was done in spring 2020 by researchers at two Finnish universities (Ahtiainen et al., 2020). This study received over 5,300 responses from comprehensive school teachers (and had separate questions for principals, students, and guardians). Although most teachers found their own devices (84%) and internet connection (74%) to be

functioning well, students' devices (51%) and internet connection (38%) functioned well less often (Ahtiainen et al., 2020, p. 17). Furthermore, during the remote teaching period, only 45% of teachers felt that they could fully assess their students' performance in different subjects or confirm that they completed all assigned tasks (Ahtiainen et al., 2020, p. 19). In addition, almost all teachers considered that the remote teaching period had increased their workload (Ahtiainen et al., 2020; OAJ, 2020). A case study by Niemi and Kousa (2020) found similar results regarding teachers' increased workload. In that study, teachers were also worried about the reliability of student assessment and the lack of normal interaction with students (Niemi & Kousa, 2020).

These prior studies provide important insight into aspects of teaching and learning during the remote teaching period in Finland. However, little is known of assessment and feedback practices that are incremental components of learning situations (e.g., FNBE, 2016a, 2016b; Mackey et al., 2016). The current study contributes new information from the perspective of foreign language teachers. This study aims to understand assessment and feedback practices in foreign language teaching during the remote teaching period 13 March to 13 May 2020. Four research questions in relation to the remote teaching period are examined: 1) How did language teachers perceive the assessment practices? 2) How did language teachers perceive the feedback practices? 3) How realistic and reliable was the final assessment of 9th graders, as perceived by language teachers? 4) Which issues did teachers focus on in the final assessment of 9th graders?

Method

The research approach taken in this study is a mixed methodology based on closed- and open-response items in an online questionnaire. The respondents were Finnish foreign language teachers at all school levels.

Online questionnaire

The research data were collected using an online questionnaire. The questionnaire was divided into six sections which explored various aspects of the remote teaching period. Each section consisted of several closed-response items (on a Likert scale 1–5) designed to explore each topic's different aspects. Some of the items were deliberately redundant in order to increase the validity and reliability of the results. Asking the same question several times from slightly varied viewpoints makes the measurement more solid: the results do not depend on one question only (see, e.g., Vanhatalo & Vehkalahti, 2020). The

closed-response items were accompanied by five open-response items. This study focused only on teachers' perceptions of assessment and feedback practices during the remote teaching period.

The questionnaire was pilot tested in June 2020. After the pilot study, we decided to delete some items that were not at the heart of our research to reduce the required response time to 15–20 minutes. The questionnaire was launched in September 2020, and it was open for three weeks. The invitation to participate was sent to language teachers in Facebook groups dedicated to language teachers and through mailing lists from local and national foreign language teacher member associations of The Federation of Foreign Language Teachers in Finland (SUKOL). About 4,000 language teachers are members of SUKOL (SUKOL, 2020). Therefore, the questionnaire was widely available to practising foreign language teachers in Finland. Like most online questionnaires, our study is subject to a self-selection bias: 'only people who are interested in a topic and feel strongly about it, whether positively or negatively, will be willing to spend 20 minutes filling out an online questionnaire on it' (Dewaele, 2018, p. 273). However, the strongest feelings about the remote teaching period in spring 2020 may have cooled down by the launch of the questionnaire in September.

Respondents

By the end of the survey period, data had been collected from 207 teachers. However, 31 respondents had only answered the background section of the questionnaire and these answers were excluded. Consequently, 176 answers were analysed for this study. Regarding gender, 164 were female (93%), nine were male (5%), and three did not reveal their gender (2%). Nearly every respondent was a qualified teacher with a master's degree, including the study of pedagogy, and a sufficient amount of completed studies in a foreign language (N = 170, 97%). Regarding age, most teachers were aged 40–49 (N = 61), 30–39 (N = 49), or 50–59 (N = 44).

Concerning teaching experience, the respondents were mostly well-experienced teachers: 62 teachers had been teaching for ten or fewer years (35%), while 53 had 11–20 years of experience (30%), and 61 had been teaching for more than 20 years (35%). Only nine respondents had taught for fewer than two years. Nearly half (N = 87, 49%) of the respondents live in the metropolitan area of Helsinki. The languages taught by the teachers are shown in Table 1.

Table 1
All respondents' teaching subjects (languages)

Language	Number	% of all the teachers
English	112	64
Swedish	88	50
German	33	19
French	32	18
Spanish	16	9
Russian	6	3
Italian	4	2
Finnish	3	2
Japanese	2	1
Latin	1	1
Finnish as a second language	1	1
Finnish sign language	1	1

As shown in Table 1, the most commonly taught languages were English and Swedish (both of which are usually mandatory for students). Regarding optional languages, especially German, French, and Spanish teachers were represented in our data. Information on the levels at which the teachers teach is displayed in Table 2.

Table 2
The level of school at which the respondents teach

School levels	At which levels the teachers teach	Based on which school the teachers answered
primary	72	38
lower secondary	85	63
upper secondary	66	55
vocational	3	2
adult education and training	23	18

Regarding schools, most of the respondents work at lower secondary (N = 85) and primary (N = 72) levels of the comprehensive school as well as general upper secondary schools (N = 66). The answers for this study came particularly from the perspective of the lower secondary level and general upper secondary school, presumably because those are the levels at which most subject teachers

work, and the questionnaire was geared more to them. Furthermore, summative assessment does not traditionally have as large a role in adult education and training as in basic and upper secondary education. As the table implies, many teachers work at more than one level.

All the responses were anonymous, but the respondents were invited to leave their contact information if they wished to participate in a follow-up interview (beyond the scope of the present study).

Methods of analysis

The data were analysed using both quantitative and qualitative methods. The quantitative data were analysed with descriptive statistics, one-way ANOVA, and one-way MANOVA in SPSS version 25. All the *I do not know* / *It does not concern me* answers were excluded in the quantitative analysis. Furthermore, the non-parametric Mann Whitney U and Kruskal-Wallis tests were also conducted to examine all the claims as the data were not evenly distributed. In cases in which there were differences between the tests, only the non-parametric results have been shown.

The qualitative data in the open-response items were analysed with thematic analysis (Braun & Clarke, 2006), using the Atlas.ti programme. The analysis was carried out as an iterative process through which the data were read through multiple times while looking for repetitive content that was then labelled with themes raised from the data. The similar themes and content were finally grouped into larger categories in accordance with the related research questions.

Results

In this section, the results are presented in the order of the research questions. When the results of the descriptive statistics are displayed, the answers are divided into three groups: disagreement (Likert 1–2), neutral (Likert 3), and agreement (Likert 4–5).

Assessment practices perceived by language teachers

The first research question aimed to study how language teachers perceived the assessment practices during the remote teaching period. Table 3 displays the answers to the questionnaire statements targeted at this question.

Table 3
Teachers' perceptions of the assessment practices during the remote teaching period

Item	Disagreement	Neutral	Agreement	All	*M*	*SD*
Assessing students in remote teaching was easy for me.	26%	30%	44%	157	3.22	1.09
I was able to assess students equally during remote teaching.	16%	31%	53%	154	3.42	1.00
I am satisfied with my assessment practices during the remote teaching period.	9%	21%	70%	157	3.78	.92
Assessment was more challenging for me than before.	25%	21%	54%	154	3.38	1.15
In my opinion, the assessment of students during remote teaching does not realistically reflect their learning.	43%	26%	31%	153	2.73	1.21

Note. M = mean, *SD* = standard deviation, All = the number of analysed answers

As Table 3 displays, the overall response to this question was positive: teachers felt that assessment was somewhat easy, that they were satisfied with the practices they used, and that they could assess their students. However, the answers were mixed, particularly in the first and the last items. While assessment during the remote teaching period was easy for many respondents, it was not so for all. Similarly, although most of the respondents felt that the assessment during remote teaching reflected student learning realistically, a considerable number of teachers disagreed. In the open-response items, some of the respondents commented on the challenges they had faced with the assessment. For example, some respondents' experience was that there was an opportunity for cheating when assignments were turned in remotely, and some students may have done so. See more in the section *Consideration of students' course work and competence demonstrations in final assessment* (below).

Language teachers' feedback practices

The second research question focused on how language teachers perceived and implemented the feedback practices during the remote teaching period. The results for this question are shown in Table 4.

Table 4

Teachers' perceptions of their feedback practices during the remote teaching period

Item	Disagreement	Neutral	Agreement	All	*M*	*SD*
During remote teaching, I gave as much feedback as before.	38%	21%	41%	162	3.09	1.18
I regularly gave feedback to my students.	8%	16%	76%	160	4.06	.98
I regularly commented on my students' progress.	12%	22%	66%	158	3.78	1.07

As shown in Table 4, teachers felt they regularly gave feedback and commented on their students' progress. Interestingly, much variation was found in the first claim, indicating extremely varied practices between the teachers regarding the amount of feedback given. The remote teaching period has affected the amount of feedback given by the teachers, depending on whether it was oral or written feedback. When asked how their oral feedback practices had been affected, 26% of the respondents reported that oral feedback had decreased 'somewhat', and 32% reported that oral feedback had decreased 'considerably'. For written feedback, the influence of the remote teaching period was the opposite. Out of the respondents, 56% reported that written feedback increased 'considerably', and 26% reported that it had increased 'somewhat'. Further statistical tests reveal significant differences in the feedback practices, especially between lower secondary school teachers and upper secondary school teachers. See more in the section *Statistically significant differences in the items* (below).

Reliability of 9th graders' final assessment

The third research question aimed to discern how realistic and reliable language teachers considered the final assessment of 9th graders finishing basic education. These questions were only targeted at teachers teaching the 9th grade, which explains the lower number of answers than the previous items. Table 5 provides the results for this question.

Table 5
Teachers' perceptions of the final assessment of 9th graders

Item	Disagreement	Neutral	Agreement	All	*M*	*SD*
In my opinion, the final assessment in the 9th grade was fair.	10%	7%	83%	73	4.22	1.07
In my opinion, the grades of the final assessment for the 9th graders in spring 2020 are comparable to previous years.	11%	16%	73%	70	3.99	1.20
The final assessment of 9th graders was not realistic in spring 2020.	75%	15%	10%	69	1.91	1.04

As Table 5 indicates, the respondents were unanimous about the reliability of the final assessment, and they perceived that 9th graders were assessed fairly. These results, therefore, differ from the previous quantitative results as these results display scarcely any variation between the respondents.

Statistically significant differences in the items

Using one-way ANOVA and one-way MANOVA, we examined whether statistically significant differences could be detected in these 11 items. We used the type of school, age group, teaching experience, and location as independent variables. Regarding the type of school, vocational school and adult education were excluded from the analysis due to there being few participants in these groups. Similarly, the age groups 20–29 and 60+ were excluded. Further analyses showed statistically significant differences in two claims regarding the type of school: *I regularly gave feedback to my students*, and *I regularly commented on my students' progress*. Table 6 provides the results obtained from the analyses.

Table 6
Items with statistically significant differences

Item	M	SD	M	SD	M	SD	F	p	η^2
	primary (*N* = 35)		lower secondary (*N* = 57)		upper secondary (*N* = 53)				
I regularly gave feedback to my students.	4.06	1.11	4.35	.72	3.81	1.08	4.350	.015*	.06
I regularly commented on my students' progress.	3.71	1.07	4.14	.83	3.57	1.17	4.597	.012*	.06

Note. * = p <.05, η^2 = partial eta squared.

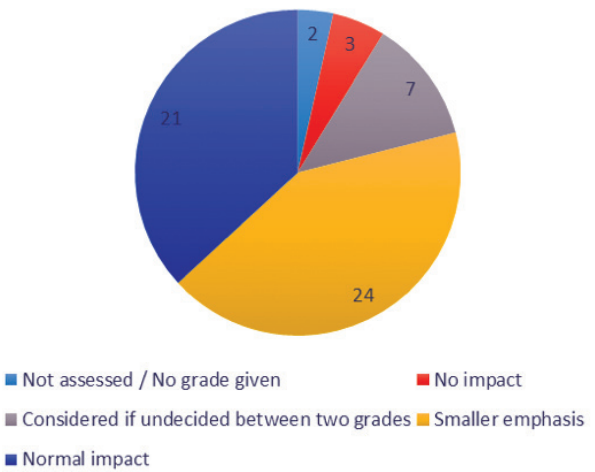
As shown in Table 6, lower secondary school teachers gave the most feedback to their students, whereas upper secondary school teachers gave the least feedback. In the same vein, lower secondary school teachers commented most on their students' progress, and in contrast, upper secondary school teachers commented least. Tukey's posthoc test revealed a statistically significant difference between the lower secondary level and upper secondary school both in the first (p = .011) and in the second (p = .011) claim. The effect sizes were medium for both items (Ellis, 2010).

Consideration of students' course work and competence demonstrations in the final assessment

Concerning the fourth research question, the respondents were invited to explain how they took into consideration students' course work and competence demonstrations during the remote teaching period in the final assessment of 9th graders. The respondents (N = 56, as the question did not pertain to all) commented on whether the student performance during the remote teaching period impacted the final assessment and/or to what extent. Most respondents also mentioned the types of competence demonstration they took into consideration in the final assessment. If a respondent did not specifically mention the impact of the remote teaching period but described assessment methods in numerous ways, it was considered a 'normal impact'. The results are depicted in Figures 1 and 2 below.

Figure 1

The impact of the remote teaching period on the final assessment



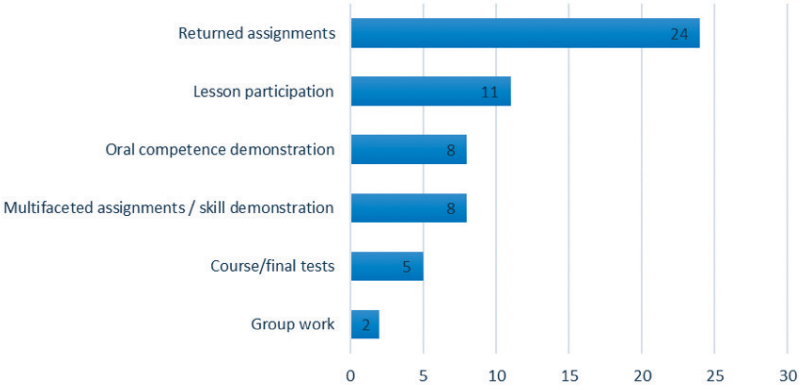
Most respondents reported that the coursework and competence demonstrations during the remote teaching period had at least some impact on the final assessment of their students. Slightly more than 40% of the teachers responded that they put less emphasis on the remote teaching period than the rest of the school year. A slightly smaller group of teachers (37%) considered student performance during the remote teaching period in the same way as in regular contact teaching. Seven teachers considered student performance during the remote teaching period only if they were undecided between two grades. Three teachers reported that they did not consider the remote teaching period in the final assessment of the language subject. It was also pointed out that student performance during the remote teaching period was not evaluated if the student had a special need for support (one response) and that, according to regular practices and upon a guardian's request, no grades were given for students studying optional language curricula (one response).

The respondents used two points to explain their decision to give no or a lesser emphasis to the remote teaching period. The remote teaching period only covered a small part of the whole syllabus that was evaluated in the final assessment (11 responses, ex. 1; all quotes translated by the authors), and they could not be certain of who had completed the assignments that were turned in (5 responses, ex. 2):

1) The remote teaching period was, after all, a short part of the whole studying time, not decisive. I did not really feel that it would have made giving grades more difficult.
2) A lot of assessment work had already been done for the final assessment, fortunately! During the remote teaching period, it was quite impossible to consider the written work in the final assessment. Because it was possible that anyone had written them. Assessment was focused on oral demonstration.

Example 2 demonstrates that the teachers tried to tackle the questions related to the integrity of student performance by choosing the types of competence demonstration during the remote teaching period that were less likely to be affected, such as oral demonstrations or tasks testing applied skills.

Figure 2
Types of competence demonstration taken into consideration in the final assessment



The types of competence demonstration taken into consideration in the final assessment include returned assignments (24 responses), lesson participation in remote classes (11 responses), and oral competence demonstration (8 responses) (see Figure 2). Some respondents did not specify individual task types but wrote that they used multifaceted competence demonstration as the basis for giving assessment (such as written assignments returned on a learning platform, active participation in oral discussion groups, etc.: 8 responses, ex. 3–4). Only five respondents mentioned that they had their students complete either smaller or larger tests that they also considered in the final assessment.

3) I considered each student's work regarding whether s/he completed tasks on time, whether s/he was present and somewhat active in online lessons (I held 'Meet-lessons' in smaller groups so that it was easier to speak the foreign language). During remote teaching, I did not assess all of the students' work. Instead, I informed them beforehand what tasks I would assess.

4) I followed students' written work and its level, actively listened to and guided small group work, and paid attention to progress in tasks on the electronic platforms.

As Examples 3 and 4 demonstrate, the teachers tried to consider multifaceted competence demonstration in the final assessment.

Discussion

This study examined how Finnish foreign language teachers perceived their assessment and feedback practices during the remote teaching period in spring 2020. The first two research questions asked about language teachers' perceptions of their assessment practices and feedback practices. Based on the results, most respondents felt that their assessment and feedback practices were implemented successfully. However, the respondents' views varied, and 25% of the teachers ($N = 39$) considered assessment more challenging than before, while 44% ($N = 69$) considered it easy. Venäläinen (2020) has found that according to most teachers (47%), grading students during remote teaching was not different compared to contact instruction, which agrees with our results. Our results differ somewhat from Niemi and Kousa's (2020) results as they reported that teachers were worried about assessment, especially about the reliability of assessment and the implementation of formative assessment. Nevertheless, Niemi and Kousa (2020) also point out that, in general, teachers exhibited positive perceptions of remote teaching. Many of the respondents in this study (37% of those completing the final assessment of 9th graders) reported that they had completed the assessment the same way as in ordinary classroom teaching.

Regarding feedback, the respondents felt that they had given feedback and commented on their students' progress regularly. The results differ from Tsagari's (2016) results as our study showed that the majority of the teachers were capable of implementing formative assessment (namely feedback) into practice in remote teaching. However, the amount of feedback during the remote teaching period changed from the usual. The results show that teachers gave less oral feedback (either somewhat or considerably for 58% of respondents) but more written feedback during the remote teaching period than in normal circumstances (either somewhat or considerably, for 78% of respondents). In the study by Venäläinen (2020), many teachers (48%) perceived it to be more difficult to give feedback in remote teaching, whereas 28% of the teachers did not find any difference. In our study, a larger percentage of teachers reported changes in their feedback practices. Teachers have reported in prior studies that their workload increased during the remote teaching period (Ahtiainen et al., 2020; Niemi & Kousa, 2020; OAJ, 2020); one reason for this could have been the time used to provide increased written feedback. Further, the results show that general upper secondary school teachers gave the least feedback to their students. However, this finding was not surprising because earlier research has established a lack of feedback in general upper secondary courses (e.g., Mäkipää & Ouakrim–Soivio, 2019). As supportive feedback is focal in online teaching (Simons et al., 2020), we recommend that

teachers critically examine their feedback practices in online teaching and ponder whether they could be enhanced.

The third research question asked how realistic and reliable language teachers perceived the final assessment of 9th graders. The teachers in our study seemed unanimous that the grades of the 9th-grade final assessment were reliable and comparable to the previous years. This finding contradicts those of Ahtiainen and colleagues (2020), who report that teachers were instructed to lower the assessment criteria or not to lower students' grades in some schools. However, it is noteworthy in our study that while teachers unanimously considered the final assessment in the 9th grade to be reliable, their responses considering the reliability of assessment in general during remote teaching were mixed. For example, some teachers commented in the open-response items that assessing student performance was challenging when assignments were turned in remotely and that it was possible to cheat. In the final assessment of the ninth graders, this challenge was easier to deal with since the remote teaching period only covered a small part (the last two months) of the whole syllabus under assessment and, therefore, the teachers had already done a fair amount of assessment by the time remote teaching was launched.

The fourth research question dealt with the issues that the teachers focussed on in the 9th graders' final assessment. Most teachers gave at least some weight to their students' coursework and competence demonstrations in the final assessment during the remote teaching period. Slightly more than one-third of the respondents considered student performance during the remote teaching period in the same way as in regular contact teaching, while about 40% considered it but with a lesser impact. The types of competence demonstration taken into consideration in the final assessment varied between the respondents. The most common competence demonstration considered for the final assessment was the assignments that students turned in. Furthermore, many teachers paid attention to their students' lesson participation and demonstrations of oral competence. Only a small minority of the respondents had used either smaller or larger tests, which is likely due to the concern that some expressed about not knowing who completes the test or whether other cheating would be involved.

Conclusions

The results obtained here have implications for developing assessment and feedback practices in online teaching. First, as most respondents in this study were satisfied with their assessment and feedback practices during the remote teaching period, it would be important to share best practices. It also

became apparent that teachers did not always consider their students' language skills comprehensively for assessment as some felt oral tasks were too difficult or not feasible to carry out in online teaching or were uncertain of who had completed the written tasks. Furthermore, some teachers experienced challenges in providing online feedback. Giving written feedback was also tedious, and it had increased teachers' workload. Therefore, in-service training should emphasise how to provide multifaceted and clear feedback in online teaching.

Second, due to the high amount of online teaching and all the experience gained during the Covid-19 pandemic, it can be speculated that online teaching will be more popular than before, even after the pandemic is over. As assessment is an integral aspect of teaching (Taras, 2005), the art of providing high-quality assessment and feedback, even in online teaching, should be incorporated into the teacher education syllabus and practised alongside in-class assessment and feedback.

Several caveats need to be noted regarding the present study. First, our participants cannot be taken as a representative sample of Finland's whole foreign language teacher population. The participants do not nationally represent Finnish language teachers at all educational levels well, as almost half of them live in the metropolitan area of Helsinki, and nearly all the participants were female. Concerning types of school, the number of participants from vocational schools or adult education and training was relatively low. Furthermore, teachers who are active on social media might have been inclined to answer the questionnaire more easily as they could have come across the invitation more effortlessly than those who received only an e-mail. In general, in the type of questionnaire that respondents can self-select whether to respond, it is expected that those who feel strongly about it, either positively or negatively, will participate (Dewaele, 2018).

Despite the caveats mentioned above, this study has successfully demonstrated how language teachers perceived their assessment and feedback practices during the remote teaching period in Finland in spring 2020. Nevertheless, further investigations are needed to examine how students have perceived teachers' assessment and feedback practices during the remote teaching period. Specifically, more research is needed to assess whether students felt that they received sufficient, appropriate, and supportive feedback for suitable tasks, how reliable assessment was from their perspective, and whether they could demonstrate their language competence in multifaceted ways.

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Higher Education Students' Experience of Emergency Remote Teaching during the Covid-19 Pandemic in Relation to Self-Regulation and Positivity

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The main objective of the present research was to explore students' experiences of emergency remote teaching during the Covid-19 pandemic. Specifically, we were interested in how strategies for coping with an emergency situation, learning strategies and positivity relate to this experience. A total of 337 university students participated in the study. The data were collected with an online questionnaire. The results show that students used more adaptive coping strategies (positive reappraisal, acceptance and refocus on planning) and fewer maladaptive strategies (blaming others, catastrophising). Furthermore, students reported the frequent use of two self-regulated learning strategies, i.e., environment structuring and goal setting, and the less frequent use of task strategies. Self-regulation and positivity explained a total of 40% of the variance of the students' experience during the pandemic. Important predictors for more constructive experience were the frequent use of goal setting and environment structuring strategies, more pronounced positivity, and less frequent use of the catastrophising coping strategy. The research findings contribute to a better understanding of students' emergency remote teaching and learning experience during the pandemic and its correlates. Moreover, the findings could enable academic staff to focus on the essential elements when supporting students to cope with the pandemic.

Keywords: coping strategies, cognitive emotion regulation, learning strategies, positivity, pandemic

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Izkušnje študentov z izrednim poučevanjem na daljavo med pandemijo covida-19 v odnosu do samoregulacije in pozitivnosti

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Glavni cilj raziskave je bil preučiti izkušnje študentov z izrednim učenjem in s poučevanjem na daljavo med pandemijo covida-19. Zanimalo nas je, v kakšnem odnosu s to izkušnjo so njihove strategije za spoprijemanje z izrednimi razmerami, učne strategije in pozitivnost. V raziskavi je sodelovalo 337 študentov. Podatki so bili zbrani s spletnim vprašalnikom. Rezultati kažejo, da so študentje uporabljali bolj prilagojene strategije spoprijemanja (pozitivno prevrednotenje, sprijaznjenje in preusmerjanje k načrtovanju) in manj neprilagojenih strategij (obtoževanje drugih, katastrofiranje). Poleg tega so študentje poročali o pogosti uporabi dveh učnih strategij, tj. strukturiranju okolja in postavljanju ciljev, ter o manj pogosti uporabi strategije prilagoditve načina dela. Samoregulacija in pozitivnost sta skupaj pojasnili 40 % variance študentskih izkušenj med pandemijo. Pomembni napovedniki za bolj konstruktivne izkušnje so bili pogosta uporaba strategij za določanje ciljev in strukturiranja okolja, izrazitejša pozitivnost in manj pogosta uporaba katastrofiranja kot strategije spoprijemanja. Ugotovitve raziskave prispevajo k boljšemu razumevanju učnih izkušenj študentov z izrednim učenjem in s poučevanjem na daljavo med pandemijo ter njihovih korelatov. Poleg tega visokošolskim učiteljem in sodelavcem omogočajo, da se pri podpori študentom za spoprijemanje s pandemijo osredinijo na bistvene elemente.

Ključne besede: strategije spoprijemanja, kognitivno uravnavanje čustev, učne strategije, pozitivnost, pandemija

Introduction

In March 2020, the onset of the Covid-19 pandemic led to the transfer of the learning setting from traditional to distance. This had an immense impact on the organisation of education worldwide and presented a major challenge for both educators and students, as it required active participation in the study process (e.g., higher motivation and increased engagement through the use of self-regulated learning strategies) and reimagining the structure and mode of the study process (Aristovnik et al., 2020; Carter et al., 2020; Hodges et al., 2020). Furthermore, most of the problems stemmed from a lack of planning, coordination and communication, which added to the stressfulness of the situation (Bozkurt et al., 2020; Browning et al., 2021). The most frequent challenges in higher education institutions were transferring the study process online, grading and evaluating students' work, offering support to foreign exchange students, and mental health care of university staff and students (Sahu, 2020). At the University of Ljubljana in Slovenia, emergency remote teaching (ERT) began on 18 March 2020, in the middle of the fifth week of a 15-week semester. At that time, all forms of face-to-face instruction and contacts were cancelled, and the use of various online forms of educational activities and communication was recommended. These restrictions were modified slightly after the 11th week of the semester to allow for practical training and final exams at the university or off-campus facilities in smaller groups and under special circumstances.

Some students were negatively affected by studying in these extreme circumstances, reporting feelings of anxiety, uncertainty and stress (Mudenda et al., 2020). Among the listed disadvantages of ERT that induced these feelings were a lowered degree of self-efficacy and deterioration of academic integrity (Li, Cao et al., 2020). In order to avoid these mishaps in the future, universities should consider a better way of evaluating students' work and leading the study process; specifically, they should focus on reducing unnecessary workload and increasing interaction between students and educators (Odriozola-González et al., 2020). Furthermore, the way the institution handles the situation and relays information to the students plays an especially important role in reassuring students and thus making the transition to ERT easier (Elmer et al., 2020; Li, Wang et al., 2020; Mechili et al., 2020; Mukhtar et al., 2020; Son et al., 2020; Wang et al., 2020). Students' attitudes towards the situation matter as well. Positive thinking and resilience can reduce the negative effects that the situation might have on their mental wellbeing (Yang et al., 2020).

On the other hand, students mentioned some advantages of ERT; namely, the flexibility of the study process and the possibility to adapt it to their

needs (Mukhtar et al., 2020). Moreover, Hamza et al. (2020) reported that the situation regarding university students' mental health was not as dire as some other studies reported, although a certain discomfort arose due to social isolation. This reinforces the need to pay special attention to students who may be at higher risk of mental health deterioration. In another study, Shawaqfeh et al. (2020) reported that the majority of students had a positive experience with ERT during the pandemic outbreak.

Based on the contemporary research findings, it can be assumed that possible factors influencing the experience of an extreme situation such as ERT during the pandemic are self-regulated learning, positivity and cognitive emotion regulation.

Cognitive Emotion Regulation

Emotions play an important role in the school setting and influence students' learning (Efklides, 2011; Frenzel et al., 2009; Kesici & Erdogan, 2009; Pekrun et al., 2011; Turner & Husman, 2008). Emotion regulation is associated with students' academic success and productivity (Bortoletto & Boruchovitch, 2013; DeCuir-Gunby et al., 2009; Pekrun et al., 2011). It is especially important in the academic context when individuals experience stressful events, as stress affects individuals' performance, physical and mental health (Pascoe et al., 2020). Individuals who better self-regulate their emotions are more resilient despite experiencing stressful life events (Troy & Mauss, 2011; Tugade & Fredrickson, 2004).

The various cognitive emotion regulation strategies one can use in stressful situations are particularly important elements of emotion regulation. Positive-focused cognitive emotion regulation includes more adaptive cognitive strategies, such as positive refocusing, positive reappraisal, putting into perspective, refocus on planning, and acceptance. Negative-focused cognitive emotion regulation consists of less adaptive strategies, such as self-blame, rumination, catastrophising and blaming others (Extremera et al., 2020; Garnefski et al., 2001; Garnefski & Kraaij, 2006). Research findings have shown that the former are associated with greater psychological and subjective wellbeing, more positive emotions and better mental health (Extremera et al., 2020; Garnefski & Kraaij, 2006; Gross & John, 2003; Gustems-Carnicer & Calderón, 2013; Lee et al., 2016), whereas the latter are associated with problems in mental health and emotional functioning (Aldao et al., 2010; Amaral et al., 2015; Garnefski & Kraaij, 2006; Sullivan et al., 1995). In contrast, Jenaabadi et al. (2015) did not confirm the correlation between the use of specific emotional regulation strategies and mental health.

Self-Regulated Learning in Emergency Circumstances

Self-regulation strategies play a crucial role in academic success, cognition, social and adaptive functioning, and postponing instant gratification. They are among the most important human skills, as they enable adaptability in different situations (Eisenberg et al., 2004; Zimmerman, 2005). Zimmerman (2013) defines self-regulated learning (SRL) as a self-directed process in which students set their own learning goals, while monitoring, controlling and regulating their behaviour, motivation and cognition. It is a cyclical process in that the self-feedback from prior performance helps students adjust their future actions. According to the triadic loop of self-regulation, it is divided into behavioural, environmental and covert self-regulation (Zimmerman, 2005). A diverse set of SRL strategies allows students to cope with various situations and social contexts more effectively (Schunk & Greene, 2018).

Usher and Schunk (2018) claimed that environment, with its different micro- and macro-level environmental factors and stressors, can have an impact on students' self-regulatory processes. From this perspective, the Covid-19 pandemic presents a specific environmental factor that has an important impact on students' SRL and cognitive emotion regulation. Effective coping with a stressful situation includes the use of coping strategies that promote resilience (Beer & Moneta, 2012; Luthar et al., 2000). Turner and Husman (2008) revealed that SRL can facilitate college students' self-regulation of emotions in stressful situations. SRL is especially important in extreme circumstances, as students are faced with new challenges and workload that influence their learning process and academic success (Bradley et al., 2017; Eom & Ashill, 2016).

In the distance education setting, students employ an array of different SRL strategies, such as environment structuring, goal setting, time management, help seeking, specific task strategies and self-evaluation (Barnard et al., 2009, Cleary et al., 2015; Karabenick & Newman, 2011; Seli & Dembo, 2020). Gonzales et al. (2020) investigated the performance of students in higher education before and after confinement due to the Covid-19 pandemic. Their findings suggest that the confinement had a significant positive effect in students' performance, as they began studying on a more continuous basis (as opposed to before the outbreak) and thus improved their self-efficacy.

Positivity

Positivity is the tendency to view life and life experiences in a positive perspective (Caprara et al., 2012). Positive orientation is the basis of self-concept,

life satisfaction and optimism (Alessandri et al., 2012). Positivity in university students positively correlates with better general health (Jenaabadi et al., 2015), personality trait energy and emotional stability, and negatively correlates with depression (Caprara et al., 2012). The more positive students are, the more they are satisfied with the quality of college life (Tho et al., 2020). Students are also more academically and socially successful, as positivity enables them to perceive themselves as being able to cope with challenges in the academic context (Barbaranelli et al., 2019). Students who report greater optimism at the beginning of the first semester at university report smaller increases in stress and depression at the end of the first semester, which shows that optimism also supports better adjustment to stressful live events (Brissette et al., 2002).

Aim of the Present Research

The main aim of the present research was to determine the predictive value of students' self-regulation and positivity for a better experience in the extreme situation of the Covid-19 pandemic. We posed three questions: How did students self-regulate during the Covid-19 pandemic in the spring semester of 2019/20? How were the students' experiences of ERT during the Covid-19 pandemic associated with cognitive emotion regulation, SRL strategies and a positive attitude towards life? What were the important predictors of students' constructive pandemic experience?

Method

Participants

The sample included 337 participants (92.6% female), all pre-service teachers at the Faculty of Education of the University of Ljubljana in the 2019/20 academic year (17.8% of the student population). Most of the students attended first-cycle study programmes (88.7%) and were fairly evenly distributed by year of study (i.e., 26.7% first-year students, 22.6% second-year students, 19.3% third-year students and 17.8% fourth-year students), but second-cycle students (9.4%) and part-time students (4.2%) were also among the participants. Most of the students were enrolled in Primary Education (26.1%), Special and Rehabilitation Pedagogy (19.0%), Two-Subject Teacher (18.4%) and Social Pedagogy (15.4%). Students from other majors were underrepresented. The age of the participants ranged from 19 to 29 years (M = 21.61; SD = 1.82). The students' mean overall academic performance was relatively high, ranging from 6 to 10 (M = 8.48; SD = .72).

Instruments

In the present study, three instruments were used that had previously been translated into Slovenian using forward translation (see Brislin et al., 1973; Weeks et al., 2007).

*The Cognitive Emotion Regulation Questionnaire – CERQ – short (*Garnefski & Kraaij, 2006) is a short form of the longer version of the questionnaire (Garnefski et al., 2001). It measures the individual's style of cognitive response to stressful events or the use of cognitive emotion regulation strategies in a particular stressful event or situation. It consists of nine scales with 18 items: Self-Blame, Blaming Others, Rumination, Catastrophising, Positive Refocusing, Refocus on Planning, Positive Reappraisal, Putting into Perspective, and Acceptance. The items are in a 5-point Likert response format (1– almost never, 5 – almost always). We first confirmed an adequate fit of the model to the predicted factor structure (χ^2 (99) = 185.60; RMSEA = .05; CFI = .96; TLI = .93) and verified the acceptable reliability of the scales (.61 < α < .85).

The Online Self-regulated Learning Questionnaire – OSLQ (Barnard et al., 2009) measures the use of self-regulation strategies in an online learning environment. It consists of six scales with 24 items: Goal Setting, Environment Structuring, Task Strategies, Time Management, Help Seeking, and Self-Evaluation. The items are in a 5-point Likert response format (1 – strongly disagree, 5 – strongly agree). We first confirmed an adequate fit of the model to the predicted factor structure ($\chi^2(174)$ = 434.54; RMSEA = .07; CFI = .89; TLI = .86) and verified the acceptable reliability of the scales (.65 < α < .79).

The Positivity Scale (Caprara et al., 2012) measures positivity, defined as an orientation to view oneself, one's own life and the future in a positive perspective. It consists of 8 items, which are in a 5-point Likert response format (1 – strongly disagree, 5 – strongly agree). We first confirmed an adequate fit of the model to the predicted factor structure ($\chi^2(9)$ = 64.94; RMSEA = .14; CFI = .93; TLI = .88) and verified the acceptable reliability of the scale (α = .85).

The Pandemic Experience Questionnaire measures the experience of studying during the Covid-19 pandemic. It consists of eight items, four of which were adapted from Ristić Dedić (2020). They refer to trusting in one's capabilities, emotional experience, level of energy and the ability to focus on studying during the Covid-19 pandemic. The other four items – about being adequately informed, trusting in completing study duties, negative thinking, and having the support of academic staff – were added for the purpose of this study. The response format is a 5-point Likert scale (1 – strongly disagree, 5 – strongly agree).

We first confirmed the one-factor structure of the questionnaire using exploratory data analysis (KMO = 0.86, Bartlett $p < .001$, one factor explains 44.6% of the variance) and verified the acceptable reliability of the scale ($\alpha = .84$).

Procedures

The data were collected over a three-week period from April to May in the spring semester of 2019/20 with an online questionnaire made in the Slovenian open source application 1KA. Participation was anonymous and voluntarily.

The data were analysed with IBM SPSS Statistics (version 22) and R (version 4.0.3). The main part of analysis was multiple regression (method Enter). Preliminary analyses showed that the assumptions for multiple regression were met: linear relationship, multivariate normality, homoscedasticity, and no multicollinearity ($1.11 < VIF < 2.21$).

Results

Students' Self-Regulation during the Covid-19 Pandemic

Table 1 presents descriptive statistics for all of the included variables. The most used cognitive emotion self-regulation strategies were positive reappraisal (e.g., thinking about giving a positive meaning to the situation in terms of personal growth), acceptance (e.g., coming to terms with what had happened), and refocus on planning (e.g., thinking about what measures to take to deal with the situation), which are considered as adaptive strategies. The least used were less adaptive strategies, such as blaming others and catastrophising (e.g., a strong emphasis on fear about the situation). The third least used strategy was positive refocusing (e.g., thinking about other, pleasant matters instead of the actual situation). The most used academic self-regulation strategies during ERT were environment structuring (e.g., choosing a comfortable space without distractions) and goal setting (e.g., setting short- and long-term goals and standards). On the other hand, task strategies were the least used during ERT (e.g., preparation of more detailed notes and questions, performing additional tasks). On average, the students reported a positive outlook on life and the future, as well as a relatively constructive experience of the current situation of ERT during the pandemic.

Table 1

Scale Properties of the Cognitive Emotion (CERQ) and Academic (OSLQ) Self-Regulation Strategies, Positivity and Pandemic Experience

	Scale	Item example	*N*	*M*	*SD*	Skew	Kurt
CERQ	Self-Blame	*I feel that I am the one to blame for it.*	314	3.18	.95	−.06	−.69
	Acceptance	*I think that I have to accept the situation.*	314	3.69	.78	−.36	−.32
	Rumination	*I dwell upon the feelings the situation has evoked in me.*	314	3.48	.96	−.24	−.74
	Positive Refocusing	*I think about pleasant experiences.*	314	2.68	.94	.47	−.36
	Refocus on Planning	*I think about a plan of what I can do best.*	314	3.58	.83	−.33	−.29
	Positive Reappraisal	*I think I can learn something from the situation.*	314	3.71	.91	−.49	−.41
	Putting into Perspective	*I think that it all could have been much worse.*	314	3.16	.92	.03	−.52
	Catastrophising	*I continually think how horrible the situation has been.*	314	2.47	1.04	.72	−.23
	Blaming Others	*I feel that others are responsible for what has happened.*	314	2.00	.64	1.07	3.09
OSLQ	Goal Setting	*I set standards for my assignments in online courses.*	303	3.65	.74	−.43	.18
	Environment Structuring	*I choose the location where I study to avoid too much distraction.*	303	4.06	.70	−.88	1.50
	Task Strategies	*I do extra problems in my online courses in addition to the assigned ones to master the course content.*	303	2.88	.88	−.10	−.48
	Time Management	*I allocate extra study time for my online courses because I know it is time-demanding.*	303	3.10	.95	−.19	−.45
	Help Seeking	*I am persistent in getting help from the instructor through e-mail.*	303	3.38	.80	−.40	−.10
	Self-Evaluation	*I ask myself a lot of questions about the course material when studying for an online course.*	303	3.41	1.05	−.37	−.47
Positivity		*I have great faith in the future.*	322	3.88	.67	−.66	.58
Pandemic Experience		*I feel competent to cope with the difficult situation I'm in.*	303	3.68	.72	−.40	−.11

Note. *SE*(Skew) = .14, *SE*(Kurt) = [.27 – .28].

The Relationship between Students' Pandemic Experience and Cognitive Emotion Regulation, SRL Strategies and Positivity

The correlations between the included variables are presented in Table 2. Correlations between the CERQ subscales ranged between –.01 and .53. Low positive correlation was present between the use of self-blame strategies with rumination, catastrophising and refocus on planning; between the use of putting into perspective strategies with refocus on planning, positive reappraisal and positive refocusing; and between the use of positive reappraisal strategies with refocus on planning and acceptance. The highest positive correlation was between two less adaptive cognitive emotion strategies: catastrophising and rumination.

All OSLQ subscales correlated positively and statistically significantly, with a mean correlation coefficient of .38. The highest associations were found between time management, task strategies and goal setting, and between help seeking and self-evaluation.

Positivity statistically significantly correlated with the use of goal setting strategies during ERT and cognitive emotion regulation strategies such as catastrophising, positive reappraisal and refocus on planning. More frequent use of these strategies was associated with a more positive outlook towards life and the future, except for the use of the catastrophising strategy, which was negatively correlated with positivity.

A statistically significant moderate positive correlation was found between positivity and the experience of ERT during the Covid-19 pandemic. More use of goal setting strategies and less use of catastrophising strategies were associated with a more constructive Covid-19 experience. Other statistically significant but low positive correlations were with SRL strategies (i.e., environment structuring, help seeking, time management, task strategies) and cognitive emotion strategies (i.e., positive reappraisal, refocus on planning); a statistically significant low negative correlation was with the rumination coping strategy.

Table 2

Correlations between the Cognitive Emotion (CERQ) and Academic (OSLQ) Self-Regulation Strategies, Positivity, and Covid-19 Experience

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CERQ Self-Blame[a]																
CERQ Acceptance																
CERQ Rumination[a]	.33***	.14*														
CERQ Positive Refocusing[a]	−.04	.19**	−.09													
CERQ Refocus on Planning	.30***	.21***	.09	.14**												
CERQ Positive Reappraisal	.08	.33***	.01	.21***	.42***											
CERQ Putting into Perspective	.21***	.28***	.04	.34***	.36***	.36***										
CERQ Catastrophising	.31***	−.02	.53***	−.02	−.07	−.28***	−.02									
CERQ Blaming others[a]	−.16**	−.02	.12*	.11*	−.09	−.11	.04	.27***								
OSLQ Goal Setting	.03	.04	.03	.04	.30***	.29***	.10	−.09	−.10							
OSLQ Environment Structuring[a]	.01	.10	.06	.05	.14*	.18**	.13*	.06	−.04	.44***						
OSLQ Task Strategies	.00	−.01	.12*	.20***	.19**	.26***	.13*	.07	.06	.54***	.34***					
OSLQ Time Management	−.05	.00	.01	.15*	.18**	.20**	.06	.06	−.02	.57***	.40***	.67***				
OSLQ Help Seeking	−.06	.06	−.02	.17**	.08	.18**	.07	−.05	−.05	.33***	.25***	.36***	.35***			
OSLQ Self-Evaluation	.02	.08	.10	.19**	.07	.04	.05	.12*	.02	.15**	.17**	.26***	.21***	.58***		
Positivity	−.06	.14*	−.15**	.16**	.30***	.32***	.10	−.37***	−.08	.38***	.23***	.20***	.17**	.25***	.15**	
COVID-19 Experience	−.09	.07	−.17**	−.02	.15**	.18**	.04	−.40**	−.06	.45***	.28***	.14*	.15**	.19***	.04	.51***

Note. [a] The Spearman correlation coefficient was used, as the distribution of the variables was not normal.
*p < .05; **p < .01; ***p < .001.

Predictors of Students' Constructive Pandemic Experience

With multiple linear regression, the features of self-regulation and positivity that contribute to a more constructive experience of ERT in the exceptional situation of the Covid-19 pandemic were analysed. The results are shown in Table 3. Regression-diagnostic procedures confirmed that the model was appropriate ($F(10, 302) = 20.89$; $p < .001$). Ten predictors explained 40% of the variance in pandemic experience ($R = .65$; $R^2_{adjusted} = .40$). Goal setting, positivity, catastrophising and environment structuring statistically significantly influenced the overall experience of ERT during the Covid-19 pandemic. The probability of a more constructive experience is increased by the frequent use of goal setting and environment structuring strategies and is more pronounced positivity, while decreasing with the use of the catastrophising coping strategy.

Table 3

Regression Coefficients of Cognitive Emotion (CERQ) and Academic (OSLQ) Self-Regulation Strategies and Positivity, on Pandemic Experience

	B	*SE(B)*	β	*t*	*p*
CERQ Rumination	.01	.04	.01	.22	.823
CERQ Refocus on Planning	–.04	.04	–.04	–.90	.370
CERQ Positive Reappraisal	–.04	.04	–.05	–1.13	.258
CERQ Catastrophising	–.18	.04	–.25	–4.49	< .001
OSLQ Goal Setting	.36	.06	.37	5.75	< .001
OSLQ Environment Structuring	.11	.06	.10	1.98	.048
OSLQ Task Strategies	–.06	.05	–.07	–1.11	.266
OSLQ Time Management	–.06	.05	–.08	–1.18	.237
OSLQ Help Seeking	.02	.05	.02	.48	.633
Positivity	.31	.06	.29	5.26	< .001

Note. $N = 303$.

Discussion

The first aim of the present research was to gain a better understanding of the characteristics of students' cognitive emotion regulation and SRL during ERT in the Covid-19 pandemic. Control over emotions is influenced not only by self-regulatory behaviours, but also by the context in which the emotional experience occurs (de la Fuente, 2020). However, individuals who use emotional

regulation strategies respond more resiliently to stressful life events (Troy & Mauss, 2011; Tugade & Fredrickson, 2004). In general, the students in the present study use more adaptive coping strategies (e.g., positive reappraisal) and less maladaptive ones (e.g., blaming others), which suggests more positive-focused cognitive emotion regulation (Garnefski et al., 2001; Garnefski & Kraaij, 2006). This could help students to better cope with ERT during the pandemic, as better regulated students might be more resilient despite experiencing stressful events (Troy & Mauss, 2011; Tugade & Friedrickson, 2004). The students' coping strategy of putting the negative situation into perspective, which is mainly aimed at reducing the seriousness of the situation or emphasising its relativity, was associated with the use of other more adaptive cognitive emotion strategies. This implies that students should acknowledge negative aspects of ERT during a pandemic, but that they need support to further implement more adaptive cognitive emotion regulation strategies to change their perspective on these aspects (e.g., acceptance, refocus on planning, positive reappraisal). Consequently, they might experience more positive emotions, which could have a positive impact on learning in the distance education setting (D'Errico et al., 2018).

Regarding SRL strategies, the results show that students most often turned to environmental structuring and goal setting, which emphasises the importance of structured study and the living environment, and of setting achievable short- and long-term goals in remote education during stressful situations. Task strategies were used the least, suggesting that students spent more time and energy planning their study process and structuring the appropriate study environment than they did on actual assignments and study tasks. The change from face-to-face study to remote study was sudden, unexpected and never experienced before, which may explain why students felt the need to address these problems first in order to successfully tackle the actual study material (see also Biwer et al., 2021).

In the present study, students' general positive orientation towards life and the future correlated positively with use of positive reappraisal and refocussing on planning, and correlated negatively with catastrophising, which implies that overall positivity correlated with the frequent use of more adaptive strategies and the less frequent use of less adaptive strategies. Similarly, Carver et al. (1989) found that the use of emotion regulation strategies in general stressful situations correlated positively with optimism and perceived control over the stressor.

In addition, we assessed the predictive value of these characteristics for a more constructive experience of the emergency situation of distance learning during the pandemic. As many researchers note, the pandemic led to changed living and study conditions (Carter et al., 2020; Sahu, 2020), which could

influence the experience of negative emotions (Bozkurt et al., 2020; Mudenda et al., 2020). The use of adaptive coping strategies (Troy & Mauss, 2011; Tugade & Fredrickson, 2004) and different SRL strategies (Bradley et al., 2017; Eom & Ashill, 2016), in addition to a more positive outlook on life (Brisette et al., 2002; Yang et al., 2020), could contribute to adaptability and a more constructive experience of the completely new situation (Tenney et al., 2016). This was also confirmed in the present study. The important predictors of a constructive experience of the pandemic and ERT were more frequent use of goal setting and environment structuring SRL strategies, a more positive outlook on life, and less frequent use of the catastrophising coping strategy. Goal setting strategies might have helped students to cope with the situation in a more effective manner, since most of the problems other students faced in a similar situation stemmed from lack of planning, coordination and communication (Bozkurt et al., 2020). Since the online learning environment provides students with more autonomy, a particularly important SRL strategy is environment structuring (Barnard et al., 2009). Students who lack the skills to organise the time and place for studying may have difficulty avoiding various distractions (e.g., social media, texting, television), which can negatively affect students' experience with ERT and their academic performance. Catastrophising positively correlated with rumination, self-blame and blaming others, and negatively correlated with positive reappraisal. This could mean that students who focused on horrific and other negative aspects of ERT during the pandemic were also more focused on thinking about their emotional and cognitive experience of the situation and on putting blame on themselves and others, and less focused on positive aspects of the event. This is in line with other research that included students or the general population: findings show that the use of maladaptive strategies was associated with lower adaptation ability, a more stressful perception of the situation, and higher levels of emotional problems, depression and anxiety (Garnefski & Kraaij, 2006; Sullivan et al., 1995). The third important predictor of a more constructive experience of ERT during the pandemic was positivity, which was also associated with use of positive reappraisal and refocus on planning, and negatively associated with catastrophising, which means that a general positive outlook correlated with frequent use of more adaptive strategies and less frequent use of less adaptive ones. This is in line with other studies that suggest positivity strengthens students' academic self-efficacy (Barbaranelli et al., 2019) and supports adjustment to stressful events (Brissette et al., 2002).

Conclusion

The results of the present study provide further insight into students' experiences of ERT during the Covid-19 pandemic. Specifically, they imply that students who successfully met the challenges of ERT were more likely to use goal-setting and environment structuring strategies, were generally more positive about life, and were less likely to use the catastrophising coping strategy.

These results must nevertheless be interpreted with caution, particularly due to the online data collection and the associated sample selection. Despite the advantages of an online survey during lockdown, the validity of the results and their generalisability might remain questionable (Wright, 2005); specifically, the recruited students, who were predominately female, represented approximately 17% of the population and were high-achieving students on average. One might therefore assume that they are more conscientious and regulate their learning better; on the other hand, we lack information about the 83% of students who are probably not so. Moreover, when discussing the results of this study it is important to keep in mind that we do not have a direct comparison with the measured variables before the pandemic.

Implications for further research may therefore arise from the presented facts, addressing both methodological and contextual variables, such as focusing on individual differences between students, as well as replication of the survey and longitudinal monitoring of students' lived experiences during the next waves of the Covid-19 pandemic and beyond.

Finally, we must not overlook the important role of academic staff, who need to be aware of the various factors that influence ERT (Bozkurt et al., 2020) and adapt their teaching methods to successfully support and guide students in the learning process. A supportive ERT environment includes regular electronic communication with students about subject content and goals, monitoring students' use of learning strategies, providing consistent support and formative feedback on students' progress, and modelling and encouraging students to use appropriate learning and coping strategies (Wandler & Imbriale, 2017). In addition, it is important to help students learn and apply metacognitive learning strategies, such as planning or adapting learning goals, which are particularly valuable in emergency situations with weak external structure and guidance (Dabbagh & Kitsantas, 2004). Overall, this provides a reasonable starting point for examining the quality of higher education organisation in emergencies through the systematic promotion of student self-regulation in learning (Rasheed et al., 2020; Tuckman & Kennedy, 2011).

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Slovenian Parents' Views on Emergency Remote Schooling during the First Wave of the Covid-19 Pandemic

Melita Puklek Levpušček*[1] and Luka Uršič[2]

In early 2020, the whole world was confronted with the emergence of the new SARS-CoV-2 virus. Due to restrictive measures, Slovenia, like most other countries, was forced to close all educational institutions. Teaching and learning shifted from classrooms to an online environment, which was a major challenge for teachers, students and their parents and required a significant amount of adaptation and effort. In May 2020, we conducted a study to investigate parents' attitudes toward emergency remote schooling. The study included 313 parents of students from the last triad of primary (compulsory) school (Grades 7–9; 12–15 years old), 147 parents of secondary school students (Years 1–3; 15–18 years old) and 35 parents of students in their final (4th) year of secondary school (18–19 years old). Specifically, parents of primary school adolescent children, in particular, reported having the most difficulty coordinating their work and the remote schooling of their child, and they also reported more difficulty motivating their child to complete schoolwork at home than the other two groups of parents did. Parents of secondary school students in Year 4 were most likely to miss personal contact with the teacher and rated emergency remote schooling as more stressful than the other two groups of parents. In general, parents rated emergency remote schooling to be more complicated and difficult than traditional classroom instruction. Most parents agree that such schooling provides students with less knowledge, which is also less consolidated, although they perceived teachers' remote help for students quite positively. They also believe that online education will become important in the future.

Keywords: emergency remote schooling, parents, attitudes, Covid-19, pandemic

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Perspektiva slovenskih staršev o izobraževanju na daljavo v izrednih razmerah med prvim valom pandemije covida-19

Melita Puklek Levpušček in Luka Uršič

V začetku leta 2020 se je ves svet srečal s pojavom pandemije zaradi novega virusa SARS-CoV-2. Zaradi ukrepov za zajezitev širjenja okužb je bila Slovenija, tako kot večina drugih držav, primorana zapreti vse izobraževalne ustanove. Poučevanje in učenje sta se iz učilnic premaknila v spletno okolje, kar je bil velik izziv za učitelje, učence in za njihove starše ter je od vseh deležnikov zahteval veliko prilagajanja in truda. Maja 2020 smo izvedli raziskavo, s katero smo želeli preučiti odnos staršev do izobraževanja na daljavo v izrednih razmerah. V raziskavo je bilo vključenih 313 staršev učencev zadnjega vzgojno-izobraževalnega obdobja osnovne šole, 147 staršev dijakov od prvega do tretjega letnika srednje šole in 35 staršev dijakov zaključnega (četrtega) letnika srednje šole. Starši osnovnošolcev so poročali, da imajo največ težav pri usklajevanju med službo in šolanjem otroka, prav tako so pogosteje poročali o težavah pri motiviranju otroka za šolsko delo doma kot drugi dve skupini staršev. Starši srednješolcev zaključnega letnika (maturantov) so najbolj pogrešali osebni stik z učiteljem in izobraževanje na daljavo ocenili kot bolj stresno kot drugi dve skupini staršev. Na splošno so starši ocenili, da je izobraževanje na daljavo zapletenejše in težavnejše od tradicionalnega pouka v razredu. Večina staršev se je strinjala, da so šolarji med izobraževanjem na daljavo pridobili manj znanja in to je bilo tudi manj utrjeno. Starši so precej pozitivno ocenili učiteljevo pomoč učencem na daljavo. Prav tako so se strinjali, da bo spletno izobraževanje v prihodnosti postalo pomembno.

Ključne besede: izobraževanje na daljavo v izrednih razmerah, starši, stališča, covid-19, pandemija

Introduction

The new coronavirus, SARS-CoV-2, first appeared in China in December 2019 and later spread worldwide rapidly. It completely changed the lives of the vast majority of people and required certain life adjustments. The World Health Organization (WHO) declared a new pandemic on March 11, 2020 (WHO, 2020). In response to the global pandemic, most countries worldwide have taken several measures to reduce the spread of new Covid-19 infections. The vast majority of countries decided to move schooling at different levels of education to online learning (Zhang et al., 2020). In many countries, schools closed in early March 2020, while in China and South Korea, emergency remote schooling[3] started as early as January 2020 (UNESCO, 2020). The closure of educational institutions has been based on findings of influenza virus transmission, as social distancing among people is required to limit its spread (Cowling et al., 2020; Jackson et al., 2016). Although research confirms the effectiveness of antiviral protection measures in slowing the transmission of infectious diseases (e.g., Auger et al., 2020; Hens et al., 2009), some authors (e.g., Viner et al., 2020) question the effectiveness of school closures during the Covid-19 pandemic. Telli Yamamoto and Altın (2020) found that education in the first wave of the Covid-19 pandemic was the second most affected area after healthcare. On April 9, 2020, UNESCO (2020) estimated that schools were closed in 193 countries worldwide by the end of March 2020, affecting 1.57 billion children and adolescents. This represents 91% of the total population of schoolchildren involved in formal education. The epidemic situation and lengthy emergency remote schooling have also affected teachers, other school staff, and parents. The reopening of educational institutions varied between countries. Several countries (e.g., Italy, Malta, Portugal) decided not to reopen their schools by the end of the 2019/20 year, and some (e.g., France, Germany, Slovenia) gradually, partially, or completely reopened them in April or May (Bregar et al., 2020). Rising infection rates led to renewed state closures in the fall and winter of 2020/21, and calls for school closures again grew louder. UNICEF (2021) reports that 'in the period between March 11, 2020 and February 2, 2021, schools have been fully closed for an average of 95 instruction days globally, which represents approximately half the time intended for classroom instruction' (p. 2).

3 Emergency remote schooling/emergency distance education must be distinguished from distance education (Hodges et al., 2020). It is only a temporary way of conducting classes that allows students to continue their education. Teachers and students cannot prepare well in advance, as it usually starts quickly and unannounced. At the same time, such education is compulsory for all involved in schooling, as long as the situation does not allow classroom teaching again.

This article focuses on the situation in Slovenia and the experience of emergency remote schooling as perceived by Slovenian parents in the first wave of the pandemic that took place in the spring of 2020. Slovenia declared an epidemic on March 12, 2020, and the government temporarily closed kindergartens and schools from March 16, 2020. As in other countries, schools in Slovenia moved lessons to a virtual environment almost overnight, which caused them to face many problems, especially in the first few weeks. After that, teachers gradually became acquainted with new tools that enable working remotely (e.g., MS Teams, Zoom, online classrooms), and students began to get used to the new school reality. After two months of remote schooling, on May 18, 2020, the students of the first triad of primary schools and students in the fourth year of secondary school returned to the physical school environment. It must be noted that the spring months of a school year represent the time when Slovenian fourth-year secondary students prepare most intensively for the Matura (i.e., general final examination), which was conducted later in June 2020 in the same form as in previous years. On May 25, 2020, 9th-grade primary-school students returned to school, and two days later, the remaining primary school students joined them, while secondary school students (first to third years) finished the school year at home (Gov.si, 2020).

Challenges of emergency remote schooling during Covid-19 pandemic

In their study, Ferri et al. (2020) reported the technological, pedagogical, and social challenges that students have encountered during emergency distance education. Their report was based on the comments of an online discussion in May 2020, which included participants from European countries working in information and communications technology (ICT), social science and education. The attendees of the online forum agreed that technological challenges mainly include problems with Internet provision and the lack of electronic devices for remote work. Furthermore, they emphasised pedagogical challenges, such as students' and teachers' lack of digital skills, the abundance of less structured content and information on the web, students' lack of motivation for schoolwork and teachers' lack of social and cognitive presence. Finally, the most often mentioned social challenges were the lack of appropriate social interaction, adequate space for work and study and parental support.

The school closures in spring 2020 required the adaptation of learning and teaching to online learning environments by using ICT, such as personal computers, smartphones, tablets, video conferencing and other

communication devices and web applications. Students and teachers began to share different learning resources, assignments, and feedback in the virtual space, which enabled them to maintain a learning community. Alea et al. (2020) found that teachers who had more ICT knowledge performed much better during the first wave of the Covid-19 pandemic than teachers who had less such knowledge. However, Dhawan et al. (2020) reported feelings of anxiety and depression in students and teachers who did not have the necessary skills to use ICT. It is also important that all those involved in distance learning have had the appropriate equipment and access to the Internet, as its absence or poor equipment can significantly slow down the entire learning process (Favale et al., 2020).

It should be mentioned that online teaching is not as strictly organised as classroom lessons are. As a result, it requires more student self-discipline and the ability to self-regulate to complete all school obligations on time (Wolters, 2003). Since the Covid-19 pandemic was the first such situation when schools were closed for several weeks, some teachers did not have enough knowledge and experience to establish appropriate interaction with students. In addition, students using computer-based learning often do not feel involved in the learning environment, as they spend most of their time doing schoolwork independently (Bouhnik & Marcus, 2005). Another problem of emergency remote schooling can be excessive workload and consequent fatigue (Brom et al., 2020; Niemi & Kousa, 2020).

Nevertheless, many authors agree that distance learning offers some advantages over traditional classroom learning. Due to increased interactivity (use of electronic presentations, videos, online exercises and quizzes, group work, independent work), students are more motivated, and therefore better engaged in learning. Students autonomously organise their time to complete school assignments (Cojocariu et al., 2013), and distance learning allows them faster access to teacher's feedback and access to a variety of resources (Dhawan, 2020). Students can access learning content online anywhere and anytime; this type of teaching also saves time (Sadeghi, 2019). Most importantly, distance learning during an epidemic enables continuing schooling for all students without interruption (Mukhtar et al., 2020).

Parental perspectives on emergency remote schooling

The Covid-19 school closures have required most parents to invest more time helping their children, and parental involvement in children's education increased substantially. Grewenig et al. (2020) conducted a study with 1099 German parents of children in primary and secondary schools

before and during school closure. The authors found greater parental involvement with academically more successful students before schools were closed. Even though most parents increased the time helping their children during school closure, the parents of academically more successful children increased it even more. Unlike traditional classroom learning, emergency remote learning may cause greater disparities between students due to different opportunities for parental support and assistance (Cullinane & Montacute, 2020).

During the first wave of the new Covid-19 epidemic in spring 2020, a few studies were conducted to examine parents' attitudes and the situation in households. A survey conducted on a sample of 122 parents of elementary school students in the United States (Garbe et al., 2020) found that parents broadly agreed with the school closure policy. During emergency remote schooling, parents were largely positive about the support given by schools and teachers, but they still faced some problems. The largest problem was the coordination of all their responsibilities, followed by encouraging the child to learn or do schoolwork, helping children with special needs, and having tools and resources for work at home (e.g., lack of access to computers or internet quality, lack of parental knowledge to help the child). Parents also noted the concern about the quality of knowledge that students will acquire during remote schooling.

Brom et al. (2020) conducted a study during the first wave of Covid-19 lockdown in the sample of over 9,800 Czech 1st–9th graders' parents. The authors reported that, on average, their children spent two to four hours a day on schoolwork, older students studied longer. At least half of that time, the children needed parental assistance. Parents helped the children by explaining the instructions for the assignments and the new learning contents and checking their school assignments. The difficulties they reported were lack of time to help their child, a lack of knowledge and skills to use technology and a lack of knowledge of the subject matter. In Latvia, an extensive study was conducted in the first wave of Covid-19 lockdown, involving 27,087 parents of school-aged children and adolescents (Jenavs & Strods, 2020). Parents were mostly involved in their child's schooling by helping their child to understand school assignments (74% of parents), to find relevant information (68%), to discuss learning strategies with the child (64%), to form the plan for schoolwork (55%), and to help the child complete school assignments (41%). Parental involvement also included encouragement (49%) and discussion with the child about his emotions and well-being (45%). Another study of parents of 738 Latvian

primary school students (Daniela et al., 2021) showed that parents missed advice from educators on how to support their children in the learning process the most. Parents also wished that schools would take more interest in how their children are doing and whether everything necessary for distance learning is available.

The European Commission's Joint Research Centre (Vuorikari et al., 2020) published a report on emergency remote schooling in 11 European countries, including Slovenia. The study included students aged 10 to 18 (n = 5466) and their parents (n = 6192). In general, the survey revealed large variations among countries in terms of perceived online learning activities and interactions with teachers through digital means. What the countries had in common was that parents of younger students were more involved in their children's schooling or helped them more in finding learning materials than parents of older students. Furthermore, parents in different European countries were worried about the impact of emergency remote schooling on the quality of students' knowledge and the possible negative impact on students' academic achievement. Most parents included in the study agreed that during the first wave of the Covid-19 pandemic, their children acquired new digital competencies and better self-determination, better organisation skills, and greater involvement in school activities. Over 80% of Slovenian parents wanted the school to enable their children to interact with schoolmates through online activities.

The present study

The present study was a part of the authors' larger study project investigating the attitudes of Slovenian adolescent students aged 13 to 18 years and their parents toward emergency remote schooling during the first wave of the Covid-19 pandemic. Parents and adolescent students responded to two separate online questionnaires. In addition to analysing data from a total sample of participants, we also tested differences in attitudes and experiences with emergency remote schooling among three groups of parents and adolescent students (7th–9th-grade primary school, 1st–3rd-year secondary school students, and 4th-year secondary school students). The first set of results with adolescent students (Uršič & Puklek Levpušček, 2020) showed that students in all three groups spent slightly more time on learning under the distance learning condition than in a physical classroom, with 4th-year secondary school graduates reporting the highest proportion of additional time spent on school obligations. A

significantly higher proportion of 4th-year secondary school than primary and secondary school students in Years 1–3 reported a lack of personal contact with teachers, inadequate explanations and poor communication with the teacher, and poor internet connection. Students in all three groups reported problems with motivation to learn and that they acquired lower quality knowledge, which was also less consolidated than is common in physical classes. In contrast, students mostly reported that distance learning was a good experience as they became more independent. They also believe that this type of learning will become important in the future.

In this article, we present the results of the second part of the study project, which focused on parents' attitudes and experiences with emergency remote schooling for their adolescent child and aimed to answer the following questions:

- How do parents of adolescent children view emergency distance education compared to traditional classroom education?
- What are the main difficulties encountered during emergency remote schooling reported by parents?
- What are parents' attitudes toward the quality of online teaching and learning, and what do they think about its prospects?
- Are there differences in the attitudes of parents of adolescent children of different ages?

Method

Participants

Data were collected from 495 parents with at least one adolescent child who experienced a remote learning environment during the spring 2020 school closures. Of this sample, 313 were parents of students in the last triad of primary (compulsory) school (Grades 7–9) (63.2%), 147 were parents of secondary school students (Years 1–3) (29.7%), and 35 were parents of 4th-year secondary school (Year 4) (7.1%). The sample included mainly mothers (91.1%). One hundred sixty-five parents (33.3%) reported having one school-age child, 209 (42.2%) reported having two school-age children, and 85 (17.1%) reported having three or more school-age children. Eleven parents reported having completed or not completed primary (compulsory) school (2.3%), 146 parents had a secondary school diploma (31.3%), 264 parents reported having a vocational college or university degree (56.6%), and 45 parents had a postgraduate degree (i.e., Master of Science or PhD (9.7%)).

Instruments

We employed an online survey that included sociodemographic information and questions designed to reveal parents' attitudes about emergency remote schooling. The respondents' demographic information was the gender of the parents, the level of education, the number of school-age children in the household, and the year in which the target child attended school (the last triad of primary school or higher). If there was more than one child in the family attending the last triad of primary school or higher, the instruction was that parents completed the questionnaire for the youngest child in the age group.

The second part of the questionnaire began with the semantic differential type of a rating scale. The participant was asked to assess emergency remote schooling compared to traditional classroom schooling on a 7-point rating scale between two polar adjectives or descriptives (e.g., 'Inefficient-Effective', 'Complicated-Easy', or 'Less consolidated knowledge-More consolidated knowledge'). The next question asked about the amount of time parents spent helping their child with schoolwork during school closure in comparison to the amount of time helping their child with schoolwork before school closure ('Much less time', 'Less time', 'Equal time', 'More time', 'Much more time', 'I do not help my child with schoolwork'). In the third question, parents were asked about 11 difficulties that they might experience during school closure (e.g., poor internet connection, lack of communication with the teacher, insufficient IT knowledge). Finally, they marked one or more difficulties that were on the list.

For the final part of the online survey, we constructed two sets of items describing parents' attitudes toward the quality of online teaching and learning and its prospects. The first set of 17 items assessed parents' attitudes toward the quality of online lessons, the quality of teachers' remote work with students, and the demandingness of online learning. Parents rated the items on a 5-point scale (1 – strongly disagree, 5 – strongly agree). A principal component analysis (PCA) with Oblimin rotation was conducted to examine the component structure of this set of items. Visual examination of the scree plot and eigenvalues of ≥1.0 indicated three components that accounted for 65% of the total variance of the items. The observed Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.902, indicating sound underlying components (Tabachnick & Fidell, 2000). Bartlett's Test of Sphericity was significant ($\chi^2 = 3042.078$; $df = 78$; $p = .000$), indicating good factorability of the correlation matrix. Thirteen items with

factor loadings > .60 were retained to enhance the strength of the three components: *Online lessons quality,* α = .83, five items (e.g., Teachers organise online lessons (via Zoom, Skype, etc.) so that they can explain learning content directly), *Teacher's remote help to students*, α = .80, five items (for example: During remote schooling, it seems that teachers support my child more than in a physical school), and *Demandingness of online learning,* α = .86, three items (e.g., It seems that the scope of learning contents is too large). The second set of six items describes parents' views of prospects and positive experiences with online teaching and learning (α = .88), example items are: 'Online education will become important in the future', 'Emergency remote schooling was a positive experience for me because I learned a lot of new things about my child and myself'. Parents rated the items on a 5-point scale (1 – strongly disagree, 5 – strongly agree).

An online survey with all questions and scales can be found in the Appendix. Only 13 items are included regarding parents' attitudes toward the quality of online teaching and learning, which were retained after the component structure analysis.

Procedure

Participants completed the questionnaire in the *1ka* online survey, which took about 12 minutes. We granted participants anonymity and the option to end their participation at any time. The snowball method was used to collect data. We posted the online survey in various social networking groups where people are interested in parenting issues and asked them to participate. We also sent the invitation to participate in the study to various primary and secondary schools, who emailed the parents in their school, inviting them to participate in the study. Data collection took place during the last four weeks of spring school closure, from May 4 to June 3, 2020. Data were analysed using the SPSS statistical software.

Results

Parents' assessment of emergency remote schooling in comparison with traditional classroom schooling

Parents rated emergency remote schooling during school closure in spring 2020 compared to traditional classroom education on a 7-point semantic differential rating scale (1 – completely agree with the adjective

written on the left, 7 – completely agree with the adjective written on the right). Table 1 presents *M*s and *SD*s for the 12 polar adjectives or descriptives (total sample, the three groups of parents). The mean-scale scores are presented with respect to the possible range of these scores, which correspond to the range of the response scale used (1 to 7).

Table 1

Ms and SDs of Parental Rates of Polar Adjectives (Emergency Remote Schooling in Comparison to Traditional Schooling in Classrooms)

	Total	Group 1	Group 2	Group 3
Polar adjective (descriptive)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Uninteresting vs Interesting	4.00 (1.69)	3.95 (1.68)	4.09 (1.70)	3.97 (1.77)
Unpleasant vs Pleasant	3.85 (1.68)	3.81 (1.68)	4.07[a] (1.63)	3.31[b] (1.76)
Complicated vs Easy	3.44 (1.63)	3.38 (1.60)	3.67 (1.65)	3.14 (1.75)
Difficult vs Effortless	3.44 (1.95)	3.33 (1.94)	3.73 (1.90)	3.11 (2.17)
Inefficient vs Effective	3.99 (1.79)	3.84[b] (1.75)	4.31[a] (1.89)	3.94 (1.59)
Non-Diverse vs Diverse	3.78 (1.72)	3.76 (1.73)	3.87 (1.73)	3.51 (1.65)
Non-Consolidated vs Consolidated Knowledge	2.90 (1.64)	2.91 (1.72)	2.97 (1.53)	2.57 (1.34)
Less vs More Knowledge	3.14 (1.73)	3.14 (1.81)	3.13 (1.60)	3.20 (1.59)
Stressful vs Relaxed	3.74 (1.94)	3.73[b] (1.91)	3.97[b] (1.96)	2.91[a] (1.87)
Less vs More Motivation	3.59 (1.82)	3.53 (1.83)	3.71 (1.80)	3.63 (1.88)
Causing More vs Less Difficulties	4.02 (1.91)	3.93 (1.89)	4.23 (1.91)	3.89 (2.06)

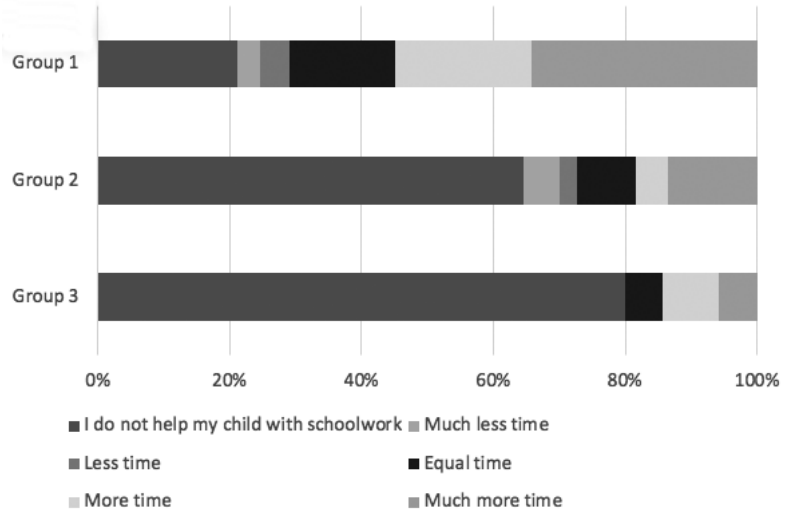
Note. Group 1 = parents of students from the last triad of primary (compulsory) school (Grades 7–9), Group 2 = parents of high school students (Years 1–3), Group 3 = parents of 4th-year secondary school (Year 4). [a b] denotes statistically significant difference between the groups.
The results are shown as the average score per each pair of adjectives (descriptives). Lower scores mean lower parental rates of emergency remote schooling.

As shown in Table 1, parents assessed emergency remote schooling as more complicated and difficult than traditional schooling in classrooms. They also reported more difficulties motivating their children and agreed that such schooling provides less knowledge to the students, which is also less consolidated than in the physical classroom setting. The average scores of other polar adjectives were around the midpoint of the scale (neutral). A one-way ANOVA was performed to determine whether parents of different aged adolescent children differed in their attitudes towards emergency remote schooling. The results showed that the three groups of parents differed significantly in polar adjectives Unpleasant vs Pleasant ($F(2,492) = 3.24$, $p < .04$, $\eta^2 = .013$), Inefficient vs Effective ($F(2,492) = 3.42$, $p < .03$,

η^2 = .014), and Stressful vs Relaxed ($F(2,492)$ = 4.30, p < .01, η^2 = .017). Post-hoc comparisons (Fisher's Least Significant Difference) showed that parents of 4th-year secondary school students assessed emergency remote schooling as more unpleasant and stressful than parents of secondary school students in Years 1–3 (p < .01 and p < .001, respectively). They also assessed emergency remote schooling as more stressful than parents of students from the last triad of primary school (p < .001). Parents of students from the last triad of primary school assessed emergency remote schooling as more inefficient (p < .05) than parents of secondary school students (Years 1–3).

Figure 1 shows the percentages of parents according to the amount of time spent helping their child with schoolwork during school closure compared to the amount of time helping their child with schoolwork before school closure. Kruskal-Wallis H test showed that the level of parental help with schoolwork decreases with the age of the adolescent child ($\chi^2(2)$ = 96.3, p < .001, η^2 = .213). Parents of primary school adolescent children were more involved in their child's schooling during the Covid-19 school closure than before it than parents of secondary school students in Years 1–3 (W = -12.19, p < .001) and secondary school students in Year 4 (W = -8.49, p < .001). About one-fifth of the parents in the first group reported that they do not help their adolescent child with schoolwork; 55% of the parents in this group spent more time and much more time helping their adolescent child during school closure than before it. About 65% of parents of secondary school students (Years 1–3) reported that they do not help their adolescent child with schoolwork and 18.4% of parents in this group spent more time and much more time helping their adolescent child during school closure than before it. Most parents of 4th-year secondary school students were not involved in their adolescent child's remote schooling; however, 14.3% of parents in this group reported more time and much more time helping their adolescent child during school closure.

Figure 1
Parental Assessment of Time Spent Helping Their Adolescent Child with Schoolwork During vs Before School Closure



Note. Group 1 = parents of students from the last triad of primary (compulsory) school (Grades 7–9), Group 2 = parents of secondary school students (Years 1–3), Group 3 = parents of secondary school students (Year 4).

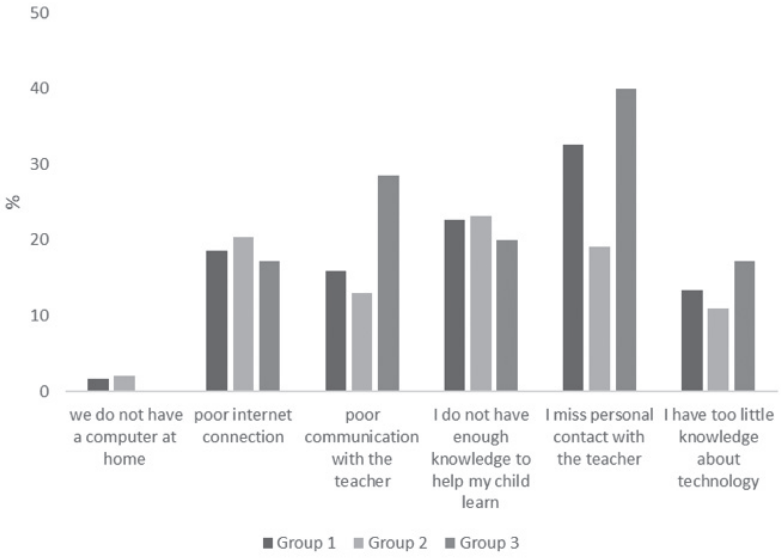
Parents' report of difficulties experienced during emergency remote schooling

Next, parents choose among 11 difficulties that their families might experience during school closure. Parents perceived the most difficulties in the following domains: coordination between work and child's school (40.81%), more school-aged children in the household (34.55%), a lack of personal contact with the teacher (29.09%), a lack of child's motivation for schoolwork (23.43%), and a lack of knowledge to help the child learn (22.63%). Figures 2a and 2b present the percentage of parents in the three groups who marked a particular item as a difficulty during school closure. As can be seen in Figures 2a and 2b, the difficulties that were most often marked by parents of primary school children were 'Coordination between work and school' (53.04%), 'More school-aged children in the household' (41.21%), and 'I miss personal contact with the teacher' (32.59%). In contrast, parents of secondary school students (Years 1–3) most often marked difficulties, such as 'More school-aged children in the

household' (25.17%), 'I do not have enough knowledge to help my child learn' (23.13%), and 'Poor internet connection' (20.41%), while parents of 4th-year secondary school graduates most often marked difficulties, such as 'I miss personal contact with the teacher' (40.00%), 'Poor communication with the teacher' (28.57%), and 'Difficulties in finding suitable learning material' (25.71%).

Figure 2a

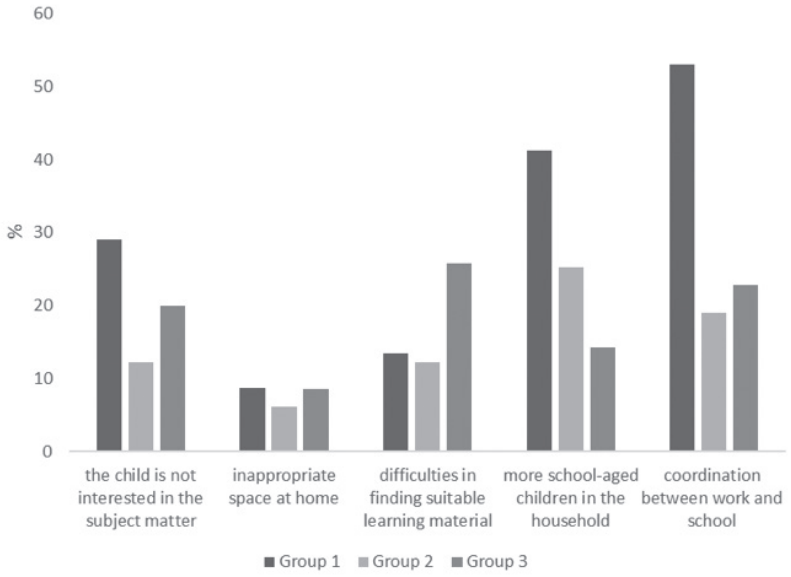
Percentages of Parents Who Marked Each Difficulty Experienced During Emergency Remote Schooling



Note. Group 1 = parents of students from the last triad of primary (compulsory) school (Grades 7–9), Group 2 = parents of secondary school students (Years 1–3), Group 3 = parents of secondary school students (Year 4).

Figure 2b

Percentages of Parents Who Marked Each Difficulty Experienced During Emergency Remote Schooling



Note. Group 1 = parents of students from the last triad of primary (compulsory) school (Grades 7–9), Group 2 = parents of secondary school students (Years 1–3), Group 3 = parents of secondary school students (Year 4).

Comparisons between the three groups of parents showed that parents of primary school adolescent children marked 'coordination between work and school' ($\chi^2(2) = 52.9$, $p < .001$) and 'more school-aged children in the household' ($\chi^2(2) = 18.2$, $p < .001$) more often as difficulties during emergency remote schooling than the two groups of parents of secondary school students. The three groups of parents also differed in their report on 'I miss personal contact with the teacher' ($\chi^2(2) = 11.1$, $p < .004$), with parents of primary school adolescent children and parents of 4th-year secondary school students marking this difficulty more often than parents of secondary school students in Years 1–3. In addition, the three groups of parents differed significantly in their report on 'The child is not interested in the subject matter' ($\chi^2(2) = 16.0$, $p < .001$). Parents of primary school adolescent children marked this difficulty more often than the other two groups of parents.

Parents' attitudes about the quality of online teaching and learning and its prospects

Table 2

Ms and SDs for the Online Teaching and Learning Scales

	Total	Group 1	Group 2	Group 3
Scale	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Online lessons quality	2.96 (.96)	2.85^{a} (.97)	3.20^{b} (.90)	2.93 (.94)
Teacher's remote help to students	3.58 (.79)	3.63^{a} (.78)	3.54 (.75)	3.28^{b} (.89)
Demandingness of online learning	3.02 (1.12)	3.13^{b} (1.0)	2.71^{a} (1.12)	3.37^{b} (1.13)

Note. Group 1 = parents of students from the last triad of primary (compulsory) school (Grades 7–9), Group 2 = parents of secondary school students (Years 1–3), Group 3 = parents of secondary school students (Year 4). $^{a\,b}$ denotes statistically significant difference between the groups.
The scale results are shown as the average score per item. The range of the response scale was 1 to 5.

As shown in Table 2, the total score on the *Online lessons quality scale* is close to the value of 3 and indicates an intermediate level of parental rate of online teaching. It seems that parents were quite undecided, or the result might indicate large differences among Slovenian schools and teachers in the quality of online teaching. The above-average total score on the *Teacher's remote help to students* scale indicates that parents perceived teachers' work with students quite positively; they mostly agreed that the instructions for schoolwork were sufficiently clear and that teachers give students enough feedback, communicate with them accordingly and offer them enough support. The total score on the *Demandingness of online learning* was around the midpoint of the scale. The results showed that the three groups of parents differed significantly at all three scales, *Online lessons quality* ($F(2,492) = 7.11$, $p < .001$, $\eta^2 = .028$), *Teacher's remote help to students* ($F(2,492) = 3.34$, $p < .036$, $\eta^2 = .013$), and *Demandingness of online learning* ($F(2,492) = 9.12$, $p < .001$, $\eta^2 = .036$). Post-hoc comparisons (Fisher's Least Significant Difference) showed that the parents of students from the last triad of primary school assessed online lessons quality lower than the parents of secondary school students (Years 1–3) ($p = .000$). Furthermore, the parents of primary school students assessed the teacher's support and help to students with schoolwork more positively than parents of 4th-year secondary school students did ($p = .03$). At last, parents of secondary school students (Years 1–3) rated the demandingness of online learning lower than the parents of primary school students and the parents of 4th-year secondary school students ($p = .000$ and $p = .001$, respectively).

In the last part of the questionnaire, parents assessed prospects and positive experiences with online teaching and learning. Table 3 shows the average scores on single items.

Table 3
Parental Assessment of Prospects and Positive Experiences with Online Teaching and Learning

Item	*M*	*SD*
Online learning could replace physical classroom learning in the future.	2.23	1.30
Remote schooling has enabled my child to perform deep learning.	2.44	1.26
Remote schooling has made my child more independent.	2.86	1.29
When the epidemic is over, classes should continue to be held occasionally (e.g., once a week) in this way.	2.67	1.49
Remote schooling has been a positive experience for me because I learned a lot of new things about the child and myself.	3.10	1.39
Online education will become important in the future.	3.34	1.32

Note. The results are shown as the average score per item. The range of the response scale was 1 to 5.

The results showed that 51.1% of parents agreed or strongly agreed about the importance of online education in the future. Despite their agreement with the importance of such education in the future, most parents (64.2%) disagree or strongly disagree with the statement that online learning will replace physical classroom learning. Similarly, 47% of parents do not support the occasional use of online learning when the epidemic is over. On average, parents were quite neutral about the statement that remote schooling was a positive experience for them and that they learned a lot about themselves and the child during this period. 34.4% of parents disagree or strongly disagree with this statement. A total of 35.3% of parents agreed or strongly agreed that remote schooling has made their children more independent.

Discussion

The emergence of the new Covid-19 pandemic and the associated remote schooling have greatly affected school children, their parents and teachers around the globe. The transition to the new way of teaching and learning required much adjustment from everyone involved. To date, there have been a few studies that examined parents' views on Covid-19 school closures (e.g., Brom et al., 2020; Daniela et al., 2021; Garbe et al.,

2020; Grewenig et al., 2020; Jenavs & Strods, 2020; Ribeiro et al., 2021). Parents are an important source of support and help in children's education in non-pandemic times, while their educational role becomes even more important in emergent situations, such as the epidemic, when school children's daily routines change and need to be adapted to the new 'online reality'. On the other hand, adolescents seem to represent a vulnerable group during state lockdowns. When countries are almost completely on lockdown and social contact is restricted, adolescents are at a severe disadvantage in gaining important social experiences and have fewer opportunities to seek social support and communication with people outside their families (Brooks et al., 2020). In addition, they have to deal with new ways of learning complex content, and final-year secondary school students in some countries are pressured by the upcoming state exam for which they have to prepare remotely. Therefore, our project aimed to investigate the attitudes and experiences of Slovenian parents and adolescent children with emergency remote schooling during the first wave of the Covid-19 pandemic. In this article, we present the results on the parental perspective, while the adolescent children perspective has been presented elsewhere (Uršič & Puklek Levpušček, 2020).

The results showed that parents assessed emergency remote schooling as more complicated and difficult than traditional classroom schooling. They also estimated that their children gained less knowledge, which was also less consolidated. Parents' reports are very similar to the parallel reports of adolescent students (Uršič & Puklek Levpušček, 2020); 50-60% of adolescent students assessed emergency remote schooling as more complicated and difficult than traditional schooling and 60-70% of them considered that they gained less knowledge, which was also less consolidated. Parents' reports of difficulty in motivating a child probably reflect the actual poorer motivation of children; 55% of adolescent students assessed remote schooling as less motivating than traditional classroom education (Uršič & Puklek Levpušček, 2020).

The second research question related to the main difficulties experienced by parents during emergency remote schooling. Parents of school-age children reported that they experienced the most difficulties coordinating between work and school and having more school-age children in the household. Both of these difficulties were reported primarily by parents of children in the last triad of primary school. Parents also reported a lack of personal contact with the teacher, which was reported more often by parents of final-year secondary school students. In addition, about

one-fifth of parents reported a lack of child motivation and knowledge to help their child with schoolwork. In the US sample, Garbe et al. (2020) reported parents' main difficulties coordinating between different responsibilities and motivating students for schoolwork. Brom et al. (2020) found that parents in the Czech Republic mainly mentioned a lack of time for all responsibilities, insufficient knowledge about ICT, and a lack of knowledge to help the child with schoolwork.

Similarly, Portuguese parents (Ribeiro et al., 2021) reported investing much time to help their children, especially parents of primary school children. All this led to difficulties in coordinating work and school activities. We can conclude that Slovenian parents faced similar problems during emergency remote schooling as elsewhere in the world - mainly the lack of time to handle the child's remote schooling and the lack of knowledge to help their child with school responsibilities.

The third research question focused on parents' attitudes toward online teaching and learning and its prospects. Parents in our sample were generally satisfied with the teachers' work, as teachers tried to create a positive online experience for students, provide knowledge of the highest quality, and offer support and help with school activities. As also found in previous studies (e.g., Garbe et al., 2020), parents perceived school and teacher support during school closures quite positively. However, parental perception of the quality of online instruction was around the midpoint of the scale. This result might reflect differences in distance learning approaches among Slovenian schools, as well as teachers' competencies and willingness to use different teaching methods that made online learning more effective. According to the teachers' reports (Rupnik Vec et al., 2020), most Slovenian teachers adapted to the situation very quickly and immediately started teaching through different online platforms. Nevertheless, in the first wave of school closures, about a third of teachers in primary schools and a quarter of teachers in secondary schools sent students only instructions and materials for individual work. As a reminder, the findings of the European Commission's Joint Research Centre in 11 European countries showed that only 40% of Slovenian students in the first wave of school closures had frequent daily online learning activities and/or daily contact with teachers (Vuorikari et al., 2020). Similar to reports on adolescent students (Uršič & Puklek Levpušček, 2020), parents agreed that online education would become important in the future. However, the results showed a less positive evaluation of remote schooling by parents than was the case in the sample of adolescent students.

The last research question addressed possible differences in the attitudes of parents of adolescent children of different ages. The results showed that parents of primary school children were significantly more involved in their child's schooling during the epidemic than parents of the other two age groups. As shown in other surveys (e.g., Ribeiro et al., 2021; Vuorikari et al., 2020), the frequency of parents' involvement in their child's emergency remote schooling decreased with the child's age. Consistent with previous findings (e.g., Grewenig et al., 2020), parents who reported being involved in their child's schooling reported higher or much higher involvement rates than pre-epidemic levels. As parents of primary school children were more involved in their child's schooling, they were more aware of their children's school activities and responsibilities. Accordingly, they were more critical of emergency remote schooling than parents of secondary school students (Years 1–3) and assessed this type of schooling as less effective. In contrast, parents of final-year secondary school students were even more critical of emergency remote schooling than parents of primary school students, even though most of them were not directly involved in their child's schooling. The reason for this was in the fact that the former group of students were preparing for the Matura, which is decisive for university enrolment.

In the first wave of the new Covid-19 pandemic, we studied emergency remote schooling, when students, their parents, and teachers were getting used to the 'new reality'. The present study results cannot be generalised to the emergency remote schooling situation in the second wave of the Covid-19 pandemic in the fall and winter of 2020/21, when all stakeholders already had some experience with distance education and learning at home. Another limitation of the present study could be the biased sample of parents. The survey was conducted online because in-person interviews were not feasible. We searched for participants in Facebook interest groups and asked various schools to distribute the online survey among parents of school children via email. In this way, only parents who were likely to be interested in parenting and who had a digital device and Internet access were included in the sample. It should also be noted that our sample did not uniformly include parents with different levels of education. Two-thirds of the parents in the sample had post-secondary education levels. A recent meta-analysis on the moderating effects of socioeconomic status in the parental involvement-academic achievement relation (Tan et al., 2019) showed that children of parents with higher levels of education benefit more from parental involvement in school than children of parents with lower levels of education do.

Further studies are needed to investigate the situation of extended emergency remote schooling in the second wave of the Covid-19 pandemic. In addition, research should follow the experiences of school children and their parents in both waves of the Covid-19 pandemic, as this would provide a broader picture of the changes in educational approaches that may occur between school closures and the changes in parents' and students' attitudes toward remote schooling.

Conclusions

The results of the study shed light on how Slovenian parents of adolescent children perceived emergency remote schooling during the first wave of the Covid-19 pandemic. Overall, parents rated emergency remote schooling as more complicated and less motivating compared to traditional teaching and learning. They reported that students acquired less knowledge, which was also less consolidated. Students and their parents faced some difficulties during emergency remote schooling; however, parents were generally satisfied with teachers' support to students. They also held an optimistic view of the importance of online education in the future.

Our results imply that special attention should be paid to the two vulnerable groups of students, namely early adolescents in the last triad of primary school and final-year secondary school students. In the last grades of primary school, adolescent students have to cope with larger amounts of learning material, which is also more complex than in the preceding school years. Abstract thinking in early adolescence is not yet fully developed. Also, many students at this age do not have fully developed self-regulation skills that are crucial for successful learning. Another vulnerable group of students during the first wave of the pandemic were secondary school students who took the Matura exam in the same form as in previous years, although preparations for the exam were shortened due to the epidemic. Similar to the reports of the 4th-year secondary school students (Uršič & Puklek Levpušček, 2020), the parents of this age group reported a lack of personal contact with the teacher and poor communication with the teacher as the most frequent difficulties. In addition, they rated remote schooling as the most challenging among the three groups of parents. Important goals of policymakers in implementing Slovenian Matura 2020 were to ensure the stability of the Matura system, to enable the completion of secondary school education and make a smooth transition to tertiary education, and to ensure intergenerational comparability. Although

all these arguments sound reasonable, more attention should be paid to possible modifications of the Matura exam in the following years, which should take into account prolonged distance education in the second wave of the pandemic and psychosocial difficulties of secondary school students during socially isolated distance education.

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Appendix

Online survey on parents' attitudes about emergency remote schooling

Gender:
- Male
- Female

The year of a target adolescent child's schooling:
- 7th (primary school)
- 8th (primary school)
- 9th (primary school)
- 1st (secondary school)
- 2nd (secondary school)
- 3rd (secondary school)
- 4th (secondary school)

The number of school-aged children in the household: _____

Education level:
- Unfinished primary (compulsory) school
- Finished primary (compulsory) school
- Secondary school degree
- Vocational college
- University degree
- Postgraduate degree (Master of Science or a PhD degree)

There are statements that are designed to decide between two adjectives, one being positive and the other negative. Please mark your agreement with the written statements on a scale from 1 to 7, where 1 means you completely agree with the adjective on the left and 7 that you completely agree with the adjective on the right.

Evaluate how you feel about emergency remote schooling during the Covid-19 pandemic compared to traditional schooling.

Uninteresting	1	2	3	4	5	6	7	Interesting
Unpleasant	1	2	3	4	5	6	7	Pleasant
Complicated	1	2	3	4	5	6	7	Easy
Difficult	1	2	3	4	5	6	7	Effortless
Inefficient	1	2	3	4	5	6	7	Effective
Non-Diverse	1	2	3	4	5	6	7	Diverse
Non-Consolidated	1	2	3	4	5	6	7	Consolidated Knowledge
Less	1	2	3	4	5	6	7	More Knowledge
Stressful	1	2	3	4	5	6	7	Relaxed
Less	1	2	3	4	5	6	7	More Motivation
Causing More	1	2	3	4	5	6	7	Less Difficulties

In comparison to schooling prior to school closures, I daily spend helping my child with schoolwork:

- Much less time
- Less time
- Equal time
- More time
- Much more time
- I do not help my child with schoolwork

Mark the problems that you face during the emergency remote schooling.

- We do not have a computer at home
- Poor internet connection
- Poor communication with the teacher
- I do not have enough knowledge to help my child learn
- I miss personal contact with the teacher
- I have too little knowledge about technology
- The child is not interested in the subject matter
- Inappropriate space at home
- Difficulties in finding suitable learning material
- More school-aged children in the household
- Coordination between work and school

Read the following statements and rate your agreement with them on a scale from 1 to 5, where 1 means you strongly disagree with the statement and 5 means you strongly agree with the statement.

1. Teachers organize online lessons (via Zoom, Skype…) so that they can explain learning content directly. (a)
2. It seems that teachers spend enough time consolidating the subject matter. (a)
3. Teachers try to help my child understand the material better in different ways (extra exercises, videos, photos). (a)
4. It seems that teachers are well prepared for this kind of teaching. (a)
5. The teachers just write down for my child what he has to do in his subject on a certain day/week (R). (a)
6. During remote schooling, it seems that teachers support my child more than in a physical school. (b)
7. The teacher's instructions for home schoolwork are clear and understandable. (b)
8. Teachers monitor my child's work and give him feedback on his work. (b)
9. Communication with teachers is adequate. (b)
10. Teachers are willing to help my child if he needs help. (b)
11. It seems that the scope of learning content is too large. (c)
12. My child spends too much time a day on schoolwork. (c)
13. The tasks my child has to do at home are too demanding. (c)

Note. a = Online lessons quality, b = Teacher's remote help to students, c = Demandingness of online learning

Read the following statements and rate your agreement with them on a scale from 1 to 5, where 1 means you strongly disagree with the statement, and 5 means you strongly agree with the statement.

1. Online learning could replace physical classroom learning in the future. (a)
2. Remote schooling has enabled my child to perform deep learning. (a)
3. Remote schooling has made my child more independent. (a)
4. When the epidemic is over, classes should continue to be held occasionally (e.g., once a week) in this way. (a)
5. Remote schooling has been a positive experience for me because I learned a lot of new things about the child and myself. (a)
6. Online education will become important in the future. (a)

Note. a = Parents' views of future prospects and positive experiences with online teaching and learning

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Effective Physical Education Distance Learning Models during the Covid-19 Epidemic

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The Covid-19 epidemic has had a strong impact on the implementation of the entire educational process due to the closure of public life and schools. Physical education (PE) teachers were faced with the challenge of conveying at a distance the learning content that they would otherwise teach in the sports hall. Our research aimed to determine which PE distance learning models proved to be the most effective during the epidemic, resulting in a high level of pupils' activity despite participation from home. In the process of data collection, we included 33 PE distance learning lessons at the lower secondary level, where six pupils (3 girls and 3 boys) wore accelerometers in each lesson (n = 198 pupils). The results showed that the most effective model was the flipped learning teaching model, where pupils were given an overview in advance of the different forms of teacher video recordings. Then they also actively participated with their ideas in the performance of the online lesson. A statistically significantly less efficient version of the flipped learning teaching model had prepared interactive assignments and games. This was followed by a combination of online frontal teaching with station work and frontal teaching. The least effective was independent work carried out by the pupils according to the instructions prepared by the teacher. Although the two flipped learning teaching models were the most effective in terms of exercise intensity, it is very difficult to implement them in practice because they require too much teacher time.

Keywords: Covid-19, online teaching, physical education, teaching models, effectiveness

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Učinkoviti modeli poučevanja športa na daljavo med epidemijo covida-19

Tanja Petrušič in Vesna Štemberger

Epidemija virusa covid-19 je zaradi zaustavljanja javnega življenja in zapiranja šol močno vplivala na izvedbo celotnega pedagoškega procesa. Učitelji športa so bili postavljeni pred izziv, kako učne vsebine, ki jih sicer izvajajo v telovadnici, poučevati na daljavo. Namen naše raziskave je bil ugotoviti, kateri modeli poučevanja športa na daljavo so se med epidemijo izkazali kot najučinkovitejši, tj. z rezultatom visoke aktivnosti učencev kljub sodelovanju od doma. V proces pridobivanja podatkov smo vključili 33 na daljavo izvedenih učnih ur športa na predmetni stopnji, znotraj katerih je vsako učno uro šest učencev (tri deklice in trije dečki) nosilo merilnike pospeška (n = 198 učencev). Rezultati so pokazali, da se je kot najučinkovitejši model pojavljal obrnjen model poučevanja, pri katerem so učenci vnaprej dobili v pregled različne oblike učiteljevih videoposnetkov, nato pa na učni uri, ki je bila izvedena na daljavo, aktivno sodelovali pri izvedbah tudi s svojimi idejami. Statistično značilno manj učinkovita različica obrnjenega modela poučevanja je bila z vnaprej pripravljenimi interaktivnimi nalogami in igrami. Sledila sta ji kombinacija na daljavo izvedenih učnih oblik frontalnega poučevanja z delom po postajah in frontalno poučevanje. Kot najmanj učinkovito je bilo samostojno delo učencev po učiteljevih pripravljenih navodilih. Čeprav sta se oba obrnjena modela poučevanja izkazala kot najučinkovitejša glede intenzivnosti aktivnosti učencev med učnimi urami, ju je težko vpeljevati v prakso, saj načrtovanje in izpeljava zahtevata precej učiteljevega časa.

Ključne besede: covid-19, poučevanje na daljavo, šport, modeli poučevanja, učinkovitost

Introduction

The Covid-19 coronavirus epidemic broke out in the Chinese province of Hubei in late 2019 but spread rapidly to many countries around the world in the first half of 2020 due to high infection rates (Velavan & Meyer, 2020), leading to the lockdown of public life and subsequent school closure (Petretto et al., 2020; Viner et al., 2020); Slovenia was no exception. Even though children were exposed to a significantly low risk of developing the disease or long-term complications after recovering from the infection (Qiu et al., 2020), they were deemed to be carriers of the virus to more vulnerable groups; so, their education was fully transferred to the online environment (Quezada et al., 2020). Such a change in work methods had a strong impact on the implementation of the entire pedagogical process. In a very short time, Physical Education (PE) teachers were compelled to find new ways to teach PE-related learning content, which otherwise takes place in a sports hall, at a distance (Varea & Gonzáles-Calvo, 2020), as effectively as possible (achieving the result of moderate and high-intensity physical activity of the pupils). Adaptation was especially challenging with types of content that require a large space (sports hall) and forms of in-class grouping that encourage socialisation among pupils (e.g., group work) (Richards et al., 2020). Distance learning with knowledge and use of various technologies enabled teaching of almost all PE-related content; thus, it was only necessary to find the most suitable approach and form of within-class grouping for each type of learning content to enable pupils to achieve their learning goals with a high activity level while maintaining a positive learning environment during PE distance learning lessons (Filiz & Konukman, 2020). Teachers were able to teach PE-related content at a distance through online classes via live-streaming, recorded videos, movement diaries, assignments for pupils, online materials with lessons with practical and theoretical content, online questionnaires or distance-learning programmes with suggestions for physical activity from home (ibid.). In addition to selecting a suitable digital tool based on learning content for distance learning, teachers also had to select a suitable form of within-class grouping. Teachers usually only use one form of within-class grouping per one hourly PE lesson when teaching in the sports hall, but to increase the pupils' activity, they could also use a combination, for example, the first part of the frontal lesson work (in queues) and then group work (at stations) (Videmšek & Pišot, 2007). Teachers can also use the same combination to teach PE at a distance on online platforms such as Zoom, Microsoft Teams, Blackboard and Canvas (Guraya, 2020), which allow pupils to be divided into 'rooms' or 'groups'.

Additionally, a different virtual approach to teaching, namely the flipped learning teaching model (Chick et al., 2020), may also improve the pupils' learning

experience. In comparison to the traditional teaching model, where the focus is on the teacher and their explanations (Betihavas et al., 2016), the flipped learning teaching model focuses on the pupils' ability to acquire new knowledge and understanding on their own through mutual collaboration (Sohrabi & Iraj, 2016). In this form of work, pupils receive material in advance in the form of various videos of practical performances, recorded lessons or short assignments, followed by a short explanation or review of the content during the lesson itself. Afterwards, the teacher divides the pupils into smaller groups. These groups discuss their newly acquired knowledge and jointly work out a specific problem-solving task related to the learning content received in the pre-prepared material (Guraya, 2020). Teachers can use the flipped learning teaching model for PE-related content under regular conditions, in which the pupils' lessons and group work take place effortlessly in a sports hall without social distancing, as well as for distance teaching, in which pupils receive pre-prepared material via online classrooms, e-mail and so on, working in small groups, during the lessons conducted via the above-mentioned online platforms (ibid.).

Distance learning overcomes the limitations of space and time (Buschner, 2006; Kooiman, 2017, Mohnsen, 2012; Mosier, 2013; Rhea, 2013); thus, not much research exists on effective approaches to teaching PE at a distance to achieve a sufficiently high moderate and high-intensity of pupils' activity during the lessons themselves. Moreover, as the lockdown of public life during the first wave of the Covid-19 epidemic happened completely unexpectedly, at that time, most teachers stepped into this new field of distance learning PE teaching unprepared. Due to the inability to predict the duration of such a work form (depending on the country's epidemiological picture), it is apparent that PE teachers need help in preparing effective distance learning lessons based on recent research findings that are specifically related to the current state of the epidemic, with the same restrictions and educational opportunities.

Therefore, in this research, we posed the following research question:

- Which PE distance learning models are most effective during the Covid-19 epidemic, resulting in a high level of pupil activity despite all limitations and participation from home?

Method

The research was conducted through an action research approach.

To determine which PE distance learning models are the most effective during the Covid-19 epidemic for pupils to achieve high levels of activity during the lessons, we used a cause-related, non-experimental work method.

Participants

The action research included 33 distance learning PE lessons at the subject level of one primary school, which were taught individually alternately by two PE teachers. Pupils from Grades 6, 7, 8 and 9 (average age: 12.5 years old) were included. There was an average of 25 pupils in each class, but for the needs of our research, only six pupils (3 girls and 3 boys) were randomly selected; only those pupils who, based on the results of their PE report card, had developed motor skills within the average of Slovenian pupils of the same age, and whose parents signed a permit to participate in the research, were included in the selection. These pupils wore accelerometers during each lesson, which showed us exactly how many minutes and seconds were spent inactively and how many were spent in low, medium, and high-intensity activities. In total, the activity level during distance learning lessons was measured with 198 pupils (i.e., 99 girls and 99 boys).

Research design

The action research aimed to discover which distance learning models proved to be most effective during the Covid-19 epidemic. The research was conducted during the closure of schools in the second wave, in October and November 2020. In October and November, we carried out an observed and monitored pedagogical process of the PE, in which we made alterations with different teaching models (we tested five different distance learning models for PE), and the preparations for implementation began about a month before the start of teaching, in September 2020.

Table 1

Five PE distance learning models

Model 1	Model 2	Model 3	Model 4	Model 5
Individual work	Frontal teaching	Combination of frontal teaching and group work	Flipped learning teaching model (with interactive assignments and games)	Flipped learning teaching model (with videos)

In Model 1 (independent teaching), pupils were given instructions in advance with detailed descriptions of movements, equipped with sketches of the correct manner of performance and with the number of repetitions for performances of each element and a record of the approximate duration of the exercise.

In Model 2 (frontal teaching), the teacher conducted a distance learning PE lesson with the pupils by signing in on the Zoom platform through computers/mobile phones when the lesson was scheduled that day. Then they performed the elements by watching a direct demonstration and listening to the teacher's explanation and then repeating the exercises themselves.

In Model 3 (a combination of frontal teaching and group work), the work was organised in the same way as in Model 2, except that the teacher combined two different forms of within-class grouping during the lesson and thus, in addition to frontal teaching, group learning was also used, and the pupils were divided across the Zoom platform's rooms. Then further work was done around the stations in the sports hall.

In Models 4 and 5 (the flipped learning teaching model (with interactive assignments and games) and the flipped learning teaching model (with videos)), pupils were given pre-prepared material, which they had to process the day before the scheduled lesson. For example, in Model 4, pupils were given interactive assignments and games that predicted the content to be learned the next day when correctly completed. Interactive assignments and games, such as online puzzles with a picture of the correct performance of a certain element, sorting the pictures correctly in the correct order of movement, naming of movements by connecting words to the pictures and so on, and performing the movements of the elements presented along with the solved assignments.

In Model 5, pupils were not given interactive assignments and games in advance but prepared videos featuring demonstrations of the elements to be learned in the next lesson. Upon observing the demonstration, they had to try to perform the elements themselves. In Models 4 and 5, the material also contained one problem-solving activity that the pupils had to consider and then solve together in small groups in the next day's PE lesson. Thus, the sum of minutes in moderate and high-intensity activity by pupils in Models 4 and 5 was the result of both parts of the lesson (on the day of the scheduled lesson and the day before, when working with material or solving assignments/games and imitating the movements on video).

The teaching and observation of PE lessons were carried out for two weeks and two days, every working day from Monday to Friday (content of the lessons: athletics, natural forms of movement, games and general conditioning). Each day, we taught and observed two or three PE lessons, including at least one break in the length of an hourly lesson, as we had to replace and disinfect the gauges and straps and then place them (without making personal contact) in front of the door of the pupils whose activity level was to be measured in the following lesson. During the handover, the gauges were inserted

into pockets on the straps, which could easily be attached to the body (so the pupils could fasten them around the waist over the T-shirt so that the gauge was on each individual's side during the lesson. Then the activity level of the six selected pupils (three girls and three boys) was measured. In four of the five types of distance PE models (independent work was conducted differently), lessons were taught individually by two alternating PE teachers. Via the Zoom online platform, they were observed by a PE didactics assistant who monitored the pupils' activity level and prepared diary records. In the independent work model, pupils could perform the work at any time during the day as they received work instructions and gauges in advance; they only needed to note the start time and finish time for the gauge data reading and enter it into the diary record. Based on these diary records, we completed the preparation of lessons and materials for pupils while entering the changes in the pedagogical process.

The purpose of the research was explained in writing to the parents of the pupils participating; complete anonymity was guaranteed for all.

Measuring instruments

Two different measuring instruments were used for the research:

- 6 accelerometers MMOXX1.07 (USB waterproof physical activity sensor 35×35×10 mm), by which we measured the pupils' activity intensity level;
- Diary records.

The accelerometers measured the pupils' activity intensity level during the lessons: how many minutes they spent in low (<3 METs[3]), moderate (3– <6 METs), and high-intensity activity (> 6 METs) (Colley & Tremblay, 2011), which was also our main indicator of the effectiveness of lessons according to the individual model tested during a particular lesson. In addition, we used unstructured instruments (diary records) to monitor and record the course of the entire action research. For each model we tested, we had a separate diary in which we recorded before each lesson what we needed for the implementation (what kind of materials are required for the pupils and which programmes will be used to prepare it), how the pupils respond during the lesson and how they participate. After the lesson, we described the material needed and used during the lesson, the length of the lesson, recommended changes for the next lesson, and most importantly: the level of pupils' activity or how many minutes they spent in moderate high-intensity activity.

3 MET: Metabolic equivalent of task: The amount of oxygen consumed while sitting at rest and is equal to 3.5 ml O_2 per kg body weight × min/one MET corresponds to an energy expenditure of 1 kcal/kg/hour.

Statistical Analysis

The acquired data were processed with the IBM SPSS Statistics 22 software for MS Windows. We first calculated the basic statistics of pupils' activity levels for each model that we studied. After that, we used the Kruskal-Wallis test to check whether there were statistically significant differences between the individual distance learning models in the number of minutes spent by pupils in moderate and high-intensity activity and then used the Mann-Whitney test to check whether statistically significant differences occurred among the models, (each model out of the five studied was compared with each of the others) and which PE distance learning models were statistically significantly the most effective according to our quality indicator (pupils' activity level).

Results

Table 2 reveals data on the number of minutes spent by pupils in 33 taught and observed PE lessons in moderate and high-intensity activity. The data in the table are separated according to the individual PE lesson model used and within the model according to class.

Table 2

Basic statistics on the sum of minutes of moderate and high-intensity activity of pupils per each type of PE distance learning model

Type of distance PE model:		N (no. of teaching hours)	Minimum (minutes)	Maximum (minutes)	Mean (minutes)	SD
Model 1: Individual work	6th grade	3	4.03	5.42	4.59	.49
	7th grade	2	3.00	5.45	4.33	.99
	8th grade	1	3.14	4.42	4.18	.64
	9th grade	1	4.09	4.27	4.18	.07
	Total	7	3.00	5.45	4.34	.70
Model 2: Frontal teaching	6th grade	7	4.32	9.45	7.18	1.36
	8th grade	3	8.05	11.08	9.23	.88
	9th grade	1	8.53	10.21	9.44	.66
	Total	11	4.32	11.08	8.09	1.69
Model 3: Combination of frontal teaching and group work	6th grade	1	15.46	16.38	16.05	.32
	7th grade	2	13.25	14.30	14.18	.38
	9th grade	2	14.13	15.47	15.32	.46
	Total	5	13.25	16.38	15.19	.95

Type of distance PE model:		N (no. of teaching hours)	Minimum (minutes)	Maximum (minutes)	Mean (minutes)	SD
Model 4: Flipped learning teaching model (with interactive assignments and games)	7th grade	1	20.45	21.30	21.06	.31
	8th grade	3	21.50	24.49	23.19	1.03
	9th grade	1	21.33	22.13	22.06	.34
	Total	5	20.45	24.49	22.22	1.10
Model 5: Flipped learning teaching model (with videos)	7th grade	1	26.01	27.09	26.48	.48
	8th grade	3	27.57	29.42	29.25	.49
	9th grade	1	27.14	28.30	28.12	.53
	Total	5	26.01	29.42	28.15	1.07

In Model 1 (individual work), pupils' average sum of minutes in moderate and high-intensity activity was the lowest, at 4.34 minutes. The lowest score for this model was 3.00 minutes, and the highest was 5.45 minutes. Model 1 was followed by Model 2 (frontal teaching) with an average value of 8.09 minutes (lowest result: 4.32 minutes, highest result: 11.08 minutes) and Model 3 (a combination of frontal teaching and group work) with an average value of 15.19 minutes (lowest result: 13.25 minutes, highest score: 16.38 minutes). Pupils achieved the highest sum of minutes in moderate and high-intensity activity in Models 4 (the flipped learning teaching model in combination with interactive assignments and games) and 5 (the flipped learning teaching model in combination with videos), where the minutes of their activity were added both days when performing pre-acquired assignments and during the lesson itself). For Model 4, the average value was 5.10+17.12 minutes (lowest result: 4.13+16.32 minutes; highest result: 6.08+18.41 minutes), and for Model 5 as much as 8.09+20.06 minutes (lowest result: 7.12+18.49 minutes, highest result: 9.27+20.15 minutes).

Table 3

Differences between PE distance learning models in terms of effectiveness

	Type of distance PE model	N (no. of teaching hours)	Mean Rank	Chi-Square	df	Asymp. Sig.
Activity intensity level (sum of minutes in moderate and high-intensity)	Individual work	7	4.34	30.013	4	*.000*
	Frontal teaching	11	8.09			
	Combination of frontal teaching and group work	5	15.19			
	Flipped learning teaching model (with interactive assignments and games)	5	22.22			
	Flipped learning teaching model (with videos)	5	28.15			
	Total	**33**				

Table 3 shows the values of the Kruskal-Vallis test, which was used to check whether there were statistically significant differences between the individual types of distance PE models used. It is evident from the Table that statistically significant differences (p <.001) appear among the individual models concerning the achieved levels of pupils' activity.

Next, we used the Mann-Whitney test to analyse which models have statistically significant differences or which models are statistically significantly more effective than others in terms of the intensity level of pupils' physical activity (Table 4).

Table 4

Differences between combinations of lessons in each PE distance learning model in terms of effectiveness

	Distance PE Model	N	Mean Rank	Mann-Whitney U	Asymp. Sig. (2-tailed)
Pupils' intensity level (sum of minutes in moderate and high-intensity activity)	Individual work	7	4.34	1.000	*.001*
	Frontal teaching	11	8.09		
	Individual work	7	4.34	.000	*.004*
	Combination of frontal teaching and group work	5	15.19		
	Individual work	7	4.34	.000	*.004*
	Flipped learning teaching model (with interactive assignments and games)	5	22.22		
	Individual work	7	4.34	.000	*.004*
	Flipped learning teaching model (with videos)	5	28.15		
	Frontal teaching	11	8.09	.000	*.002*
	Combination of frontal teaching and group work	5	15.19		
	Frontal teaching	11	8.09	.000	*.002*
	Flipped learning teaching model (with interactive assignments and games)	5	22.22		
	Frontal teaching	11	8.09	.000	*.002*
	Flipped learning teaching model (with videos)	5	28.15		
	Combination of frontal teaching and group-work	5	15.19	.000	*.009*
	Flipped learning teaching model (with interactive assignments and games)	5	22.22		
	Combination of frontal teaching and group-work	5	15.19	.000	*.009*
	Flipped learning teaching model (with videos)	5	28.15		
	Flipped learning teaching model (with interactive assignments and games)	5	22.22	.000	*.009*
	Flipped learning teaching model (with videos)	5	28.15		

Table 4 shows the results of the Mann-Whitney test, which was used to check which distance PE models have statistically significant differences concerning pupils' activity. Each model used was compared with each other, and statistically significant differences having a risk of less than .05 are marked in italics in the table. Table 4 shows that statistically significant differences in the achievement of high-intensity activity occur among all five distance PE models tested (the models in Table 4 are ranked from least to most effective). This tells us that each of the studied models is statistically significantly more effective than the previous one in terms of achieving the highest possible medium and high intensity of pupil activity during lessons; the least effective model was individual student work, followed by statistically significantly more effective results between each frontal teaching, combined frontal teaching and group work, flipped learning teaching model (with interactive assignments and games) and flipped learning teaching model (with videos).

Discussion

The most important contribution of the above-mentioned research is gaining insight into which distance teaching models can most effectively impact the higher achieved levels of moderate and high-intensity activity in distance PE lessons. Since the Covid-19 epidemic has temporarily altered the school teaching system (Petretto et al., 2020; Viner et al., 2020), distance learning is currently unavoidable, bringing a host of obstacles, including a lack of space, poor visibility of direct demonstrations, the teachers' inability to protect and assist the pupils' performances of elements, lack of tools, props, and similar issues. Nevertheless, teachers must teach pupils PE lessons in compliance with all restrictions; thus, they should select the model that would best allow them to transfer knowledge to pupils concerning the content they want to teach, concerning the barriers brought on by distance teaching of such content and, at the same time, to consolidate or transmit new learning material and thus enable a high level of pupils' activity in the most diverse and interesting way possible.

The research provided an answer to the research question of which PE distance learning models were most effective during the Covid-19 epidemic, resulting in a high level of pupil activity despite all limitations and participation from home. Each individual studied model brought both advantages and disadvantages or limitations in teaching due to the declared epidemic. Therefore, in the following, we conducted a more detailed analysis of the comparisons between each one.

In comparison with the other four models studied, individual work proved to be the least effective distance learning model for pupils (p = .001; .004; .004; .004). With this model, pupils were given instructions in advance for individual work at home or exercise in nature. Considering the average number of minutes spent in moderate and high-intensity activity, very low values were achieved here (M = 4.34 minutes). From the obtained results, we could conclude that without the teacher's direct supervision, not all pupils performed the elements qualitatively and correctly. Based on interim results and diary records of their obligations, we tried to increase the duration of independent work and the number of repetitions during the research, but their minutes spent in moderate and high-intensity activity did not improve statistically significantly. This model brought advantages such as unlimited space and an unnecessary internet connection, as the elements could be performed outdoors, and disadvantages such as insufficient teacher supervision, poor performance and perhaps a poorer understanding of instructions and poorer performance of required exercises without direct demonstration. In this regard, Goudas & Magotsiou (2009) state that pupils in their study felt statistically significantly better about individual learning than group learning, as they expressed discomfort with the implementation of elements in group learning.

Frontal teaching via the zoom platform has proven to be a slightly more effective model. Here, pupils achieved slightly higher results (M = 8.09 minutes) than the individual work in terms of minutes spent in moderate and high-intensity of pupils' activity. Here, we expected even higher values as it was a frontal form of lesson, except that both the pupils and the teacher participated in the work from home. The frontal form of learning makes it easier to control all the children, as we provide instructions (demonstration, explanation, etc.) to all the pupils simultaneously (Zajec, 2009). The negative feature of this form of learning is that it is more difficult to use differentiation and individualisation in this way because the tasks are usually the same for all pupils, which means that some may be too much or too little demanding and do not encourage imagination, independent thinking, curiosity, and creativity (Kavčnik, 2008). In our study, the teacher taught them in a similar way as in school, yet tailored to the situation, with explanations, direct demonstrations and repetition. The problems encountered here included poor visibility of the direct demonstration (e.g., body position (bending backwards, forwards, to the side, etc.), lift height, gaze orientation, etc.), the teachers' inability to observe and correct all pupils' performances at once, negative exposure of each pupil in front of all the classmates when correcting performances, spatial problems in performances, problems with the Internet connection and, consequently, several times, worse communication between teacher

and pupils. Despite the constant monitoring of pupils by the teachers, which was feasible compared to the previous model, due to the aforementioned obstacles that frontal teaching brings in distance learning of PE, the pupils achieved significantly low values in moderate and high-intensity activity.

Depending on the intensity of activity shown by pupils, frontal teaching was followed by a combination of frontal teaching and group work at stations (M = 15.19 minutes). Such a result is already quite high in terms of distance work as when performing work in the sports hall; the goal is to achieve at least 50% of the time devoted to the PE (at least 22.5 minutes) in moderate and high-intensity activity (Hollis et al., 2016). With distance work, the lessons are shorter (approx. 30 to 35 minutes), so even half of this time spent in moderate and high-intensity activity is a good enough result. This model had similar problems as with frontal distance learning, except that the pupils here were not so negatively exposed as the corrections of their performances were heard in small groups. The advantage of this form of work was that the teacher could first explain the material to everyone and demonstrate the work that awaited the pupils at each station; then, the performances were rehearsed in front of a small group of classmates at their stations or rooms. Next, the teacher randomly divided them into stations, where they remained until the end of the lesson. In the meantime, the teacher joined the rooms, observed their work, gave them additional instructions, motivated them and corrected their performances. After about three to five minutes, the assignments at each station were switched as if the pupils were moving to the next station. In this way, the work was kept interesting and diverse, ensuring the pupils did not start to get bored, and as a result, they reached higher levels of activity intensity. This form of work also allowed teachers to monitor the work of each student quite effectively.

The combination of frontal teaching and group work at stations was followed by the flipped learning teaching model, depending on the intensity of the pupils' activity, in which pupils received material in the form of interactive assignments and games (M = 22.22 minutes; the result is the sum of both workdays). Such a teaching model has proven to be the second most effective in achieving high-intensity activity during lessons. Pupils received the learning material through interactive assignments and computer games, which was a great approach to learning. It is largely known that pupils spend too much time in front of computers (Sharma & Majumdar, 2009), and during the Covid-19 epidemic, this amount of time increased due to compulsory social distancing from their peers (Montag & Elhai, 2020), and their motivation for classical learning decreased (Dietrich et al., 2020). So, we combined the teaching of materials through interactive assignments and games so that the time they spent playing games

also brought them some new knowledge. They enjoyed playing computer games (puzzles, composing terminology, connecting words to pictures, rearranging the order of movements and so on, while imitating movements and performing various elements demonstrated through assignments and games, etc.). By solving assignments and playing games, they gained minutes of activity on a day when there is no PE lesson scheduled, but at the same time, they received insight into the next PE lesson and group problem-solving activity with classmates. In the lesson itself, the teacher initially only briefly explained the content of the lesson, which they learned a lot about the day before through games, and then randomly divided them into groups, where they could immediately start solving the task, which they also already got with the assignments and games, so no time was wasted here by giving additional instructions. The pupils solved assignments in groups with movements, so they were active for nearly the entire time of group work; simultaneously, no one was negatively exposed to ignorance, as they all got at least minimal insight through the previous day's assignments. In our action research, such a model has proven to be extremely effective. However, its disadvantage is the large amount of time such preparations took from teachers, as we had to design interactive assignments and games according to the content of each lesson and pass them on to the pupils. Certain problems also occurred with pupils who had older computers and poorer internet connections as newer computer systems only supported certain games.

The statistically significantly most effective model in terms of the number of minutes spent in moderate and high-intensity activity proved to be the flipped learning teaching model, which was organised in the same way as the previously described model, only that the material received in advance by pupils was not in the form of interactive tasks and games, but in the form of videos (M = 28.15 minutes; the result is the sum of both days of work). The videos showed a direct demonstration of each element they needed to learn for the upcoming lesson (demonstrations were recorded from different angles and at different speeds of implementation, thus adding differentiation to learning; these could be watched and performed at a slower pace by the weaker ones or at a more demanding faster pace by the stronger ones, and a demonstration of incorrectly performed elements so that pupils would not repeat such mistakes).

Furthermore, the recordings contained music and slipups during the recording sessions, making them more interesting for the pupils, who wanted to replay them several times (their opinions on the performances were also included in the diary records for the intermediate upgrade of teaching preparations). Such a model proved to be the most effective but also the most demanding for teachers to implement. In addition to the large amount of time necessary for

preparing the implementation of this model (model 5 requires even more time than model 4; about 5-6 hours to edit a recording only 8-10 minutes long, excluding planning and recording), for such preparations, teachers urgently need help with the filming, as the recordings of movements in direct demonstrations of elements are not visible enough.

Based on the stage of the learning process, each PE distance learning model that we studied included lessons that provided new learning material and consolidation, enabling us to compare the effectiveness between them.

Conclusions

Distance learning of PE has become a special challenge for those who teach this subject, as they bear part of the responsibility to achieve the recommended daily amount of physical activity of individuals, which is extremely important for maintaining health and strengthening the immune system and consequently to combat Covid-19 disease effectively. Recommendations and measures during the epidemic, such as staying at home, closing parks, sports halls, fitness centres and similar, were necessary to curb the spread of the disease but had a significant effect on reducing the recommended daily amount of physical activity of individuals (Siordia Jr., 2020). Of the five distance PE models studied, only two proved to be extremely effective in achieving a sufficient amount of moderate and high-intensity activity, namely the flipped learning teaching model in combination with the material in the form of interactive assignments and games and the flipped learning teaching model in combination with the material in the form of videos. The model involving a combination of frontal teaching and group work at stations also provided satisfactory results as the pupils spent about 50% of the time of shortened PE distance learning lessons (about 30-35 minutes) in moderate and high-intensity activity.

In the action research, we examined and observed 33 distance-learning PE lessons, in which we introduced five types of distance PE models that we designed based on theoretical models and transferal of teaching practices held in schools. Based on the designed models, we prepared the material and implementation plan for each lesson according to the content with the help of accelerometers and diary records. After conducting the measurements, as the final part of the action research, we presented the concept of working with five PE distance learning models to all PE teachers working at the school. We provided them with data on the intensity of pupil activity in each model, the daily records of lessons taught, interactive tasks with access passwords and instructions on how to design new ones for other content that were not included

in our research, and videos with notes of how we filmed them ourselves and edited them into meaningful teaching material. Despite good preparation, the research had several limitations, particularly the inclusion of only one school and consequently a smaller sample group, incomplete numerical distribution of lessons concerning each model (the most effective models were studied at the minimum number of lessons) and inequality of learning content among some models (the MET level also depends on the content of exercise and didactic level, which varied in the study), making generalisation limited. Additional research regarding distance teaching of PE will be conducted on a larger sample group with various ages of children and with a larger number of hours for each type of learning content in each model. Distance education is currently a major concern for all teachers as it is unknown how long such a situation will last or when it might recur. For this reason, they must be maximally prepared to conduct effective distance learning lessons. For this reason, in the future, we aim to research and discover the effectiveness of new distance learning models for PE, which we have not been able to include in the current action research.

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The Effects of Remote Pandemic Education on Crafts Pedagogy: Opportunities, Challenges, and Interaction

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The Covid-19 pandemic caused many sudden social changes, including a shift to remote education in many countries. In Finland, remote education also concerns crafts as a standard school subject, combining aspects of art, design, textile, and technology in basic education. Accordingly, Finnish craft teachers faced the unprecedented situation of teaching remotely a subject, which often involves hands-on activities with tangible tools and materials. The present study explores how craft pedagogy has been adapted to remote education by looking at the opportunities and challenges it faces and the effects on classroom interaction. The data consist of the output of two webinars (i.e. 27 group assignments from 123 participants) organised in the autumn of 2020 and targeted at craft teachers and student craft teachers at various levels of the education system. The qualitative, data-driven content analysis reveals that remote teaching provides beneficial opportunities for involving students' everyday lives and families in craft education. However, challenges exist relating to the unequal distribution of materials, as well as technical and social resources at different levels of education and in various contexts. Our study also finds that remote teaching is more teacher-centred and task-oriented than classroom interaction. Online teaching facilities allow teachers to provide students with more individual feedback but make maintaining students' peer interaction difficult. Although remote craft education was considered very challenging at first, teachers have managed to create useful pedagogical practices to be utilised in and beyond the era of the Covid-19 pandemic.

Keywords: crafts, craft education, remote pedagogy, distance learning, pandemic pedagogy

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Učinki pandemičnega izobraževanja na daljavo na obrtno pedagogiko: priložnosti, izzivi in interakcija

Anna Kouhia, Kaiju Kangas in Sirpa Kokko

Pandemija covida-19 je v veliko državah povzročila številne nenadne družbene spremembe, med drugim tudi prehod na izobraževanje na daljavo. Na Finskem se izobraževanje na daljavo nanaša tudi na obrt kot na navaden šolski predmet, ki v osnovnem izobraževanju združuje vidike umetnosti, oblikovanja, tekstila in tehnologije. Skladno s tem so se finski učitelji obrti spoprijeli s situacijo poučevanja na daljavo brez primerov, ki pogosto vključujejo praktične dejavnosti z otipljivimi orodji in materiali. Ta raziskava preučuje, kako se je obrtna pedagogika prilagodila izobraževanju na daljavo, pri čemer obravnava priložnosti in izzive, s katerimi se spoprijema, in učinke na interakcijo v razredu. Podatki so sestavljeni iz rezultatov dveh spletnih seminarjev (tj. 27 skupinskih nalog 123 udeležencev), ki sta bila organizirana jeseni 2020 ter namenjena učiteljem in študentom obrti na različnih ravneh izobraževalnega sistema. Kvalitativna vsebinska analiza, ki temelji na podatkih, razkriva, da poučevanje na daljavo zagotavlja koristne priložnosti za vključevanje vsakdanjega življenja učencev in njihovih družin v obrtno izobraževanje. Ostajajo pa izzivi, povezani z neenakomerno porazdelitvijo gradiv ter tehničnih in socialnih virov na različnih ravneh izobraževanja in v različnih kontekstih. Naša raziskava tudi ugotavlja, da je poučevanje na daljavo bolj osredinjeno na učitelja in nalogo kot interakcija v razredu. Spletni učni pripomočki učiteljem omogočajo, da učencem zagotovijo več individualnih povratnih informacij, vendar otežujejo vzdrževanje medsebojne interakcije učencev. Čeprav se je zdelo poučevanje obrti na daljavo najprej zelo zahtevno, je učiteljem uspelo ustvariti koristne pedagoške prakse, ki jih je mogoče uporabiti v obdobju pandemije covida-19 in po njem.

Ključne besede: obrt, obrtno izobraževanje, pedagogika na daljavo, učenje na daljavo, pandemična pedagogika

Introduction

Prior to the pandemic, online teaching and learning mostly offered alternative ways of studying. Previous studies have recognised that online education operated from a distance has been crucial in providing education to remote places with few students or in offering courses on specific topics not available for many learners otherwise (e.g. Øgaard, 2018). Indeed, online and remote education can be effectively delivered if it is well designed and carefully planned. In contrast to this, the Covid-19 pandemic threw educators into a situation that required them to change their pedagogy almost overnight (e.g. Iivari et al., 2020; Niemi & Kousa, 2020). This sudden shift has been called 'emergency remote teaching and learning' (ERT) and 'pandemic education' (Hodges et al., 2020; Milman, 2020).

Pandemic remote education forced teachers to seek new pedagogical approaches to teaching crafts, and there is a need for research on their experiences and pedagogical solutions. In this article, we use 'remote' education to refer to the teaching and learning of crafts utilising virtual and digital means in a way that is not necessarily online all the time (Ilomäki & Lakkala, 2020) or 'distant' in the sense of attempting to reach faraway places (Øgaard, 2018). Moreover, we use 'pandemic' to refer to the situation specifically caused by the Covid-19 crisis.

Only about a year after the outbreak of Covid-19, research has broadly explored the implications of pandemic pedagogy for art and design education, notably how art and craft teachers have strived to reach the requirements of the curriculum without face-to-face and material interaction (Coleman & MacDonald, 2020; Freedman & Escaño, 2020; Kini-Singh, 2020). Continuing this line of research, this study aims to provide an understanding of the challenges and opportunities of remote education from the perspective of craft pedagogy and examine how remote education has reconditioned interaction within craft classes in Finland.

Finnish craft education has been developed within Craft Science, which is a specific Nordic academic discipline (Kokko et al., 2020; Kokko, 2021). In Finland, the roots of craft science are on researching craft education and the teaching of it. The research presented in this article relies on this methodological and theoretical ground. We base our article on data gathered in two webinars on remote craft education that we, as craft teacher educators, arranged for Finnish craft teachers and student craft teachers in autumn 2020. The qualitative data analysis revealed aspects of remote craft education that can be utilised when developing the future of craft education.

Finnish craft education in the context of global pandemic education

The imperative of education and learning not to stop under any circumstances (UNESCO, 2020) leads educators to find ways to guarantee its continuation and retain a sense of normality (Popa, 2020). As teachers are often highly committed to their work, they strove to cope with the pandemic situation by adopting new digital pedagogical practices both in Finland (FINEEC, 2020; Ilomäki & Lakkala, 2020) and elsewhere (e.g. Garzón Artacho et al., 2020; Giovannella et al., 2020). However, there are concerns about the quality of remote education and the fact that school closures put students in various countries in unequal situations (d'Orville, 2020). Furthermore, remote education inevitably requires digital tools and internet access, which are not readily available to students in low-income countries (d'Orville, 2020). Furthermore, many students may lack the supporting circumstances for remote learning, such as a peaceful space at home and parental support (Arnove, 2020).

The equity of education that has been topical in global educational policies concerns possibilities of educational equity related to issues such as gender, sexual orientation, ethnicity, religion, the socio-economic background of the students, the disparity of the resources available in different countries, and questions of inclusion (Alcott et al., 2018; d'Orville, 2020). Pandemic education has raised new equity concerns. In addition to the above-mentioned disparity of learning facilities, the equity questions expand to the unequal opportunities to engage and participate in arts, and creative activities (Choi et al., 2020), as well as the amount of support students and teachers receive for working in a new situation (Kini-Singh, 2020).

The Finnish National Core Curriculum for Basic Education 2014 (FNBE, 2016, published in English in 2016) includes various so-called artistic and practical subjects, namely crafts, music, visual arts, physical education, and home economics. In the curriculum, craft is described as 'an exploratory, inventive, and experimental activity in which different visual, material, and technical solutions as well as production methods are used creatively' (FNBE, 2016, p. 772). Accordingly, working methods, learning environments, and materials of both technical work and textile work are implemented within the craft subject.

In elementary education (Grades 1–6, age 7–12), crafts are mainly taught by the generalist class teacher, whereas in lower secondary schools (Grades 7–9, age 13–16) crafts are taught by subject teachers with specialised competence and qualifications for teaching crafts. Since the subject was formerly divided into textile work and technical work, there are often different subject teachers for

these two study fields. Although crafts is nowadays a common subject consisting of both technical work and textile work, only a small number of craft teachers are qualified in both subject areas. Therefore, cooperation between craft teachers is crucial to reach the targets of the curriculum (Kokko et al., 2020).

In adult education, crafts tend to be more content-specific than in basic education. In Finland, liberal adult education institutions include adult education centres, folk high schools, learning centres, sports training centres and summer universities. Liberal adult education is based on the principles of lifelong learning and education for active citizenship, providing craft education in the form of subject-specific courses, such as upholstery or metalwork (MinEdu, 2021). Vocational education defines crafts by fields of vocational education and training, developing specialised competence and the skills required in working life in branches like textiles and fashion or the wood industry (MinEdu, 2019). Crafts in higher education are manifested as specialised knowledge in the field of science or study programme they precede, such as craft teacher education or apparel design.

A recent report on the effects of the pandemic on the equity of education in Finland (FINEEC, 2020) revealed differences in the capacities of teachers and schools to arrange quality remote education. Schools differ in their approaches and capabilities to provide their students with adequate tools and materials for remote learning. The Finnish Education Evaluation Centre report (FINEEC, 2020) revealed that teachers in Finnish non-formal liberal adult education had experienced more difficulties in remote education than teachers in basic education. An essential factor related to this was the challenges that adult students of liberal education had in using Information and Communications Technology (ICT). Research has also revealed that teachers' workloads have increased due to remote education (FINEEC, 2020; Kini-Singh, 2020). According to Kini-Singh (2020), this relates especially to creative arts teachers, who have needed to adapt traditional art and design teaching techniques and invent new pedagogical solutions for teaching creative skills. However, in line with Wood (2021), we perceive craft as a paradigm that has powers and possibilities as a praxis of positive change due to its heterogeneity, pace and value placed on human-centred production.

Method

The context and participants of the study

Data were collected via two open webinars on remote craft education arranged by the present study's authors in autumn 2020. As professionals working in craft teacher education in Finland, we were also struggling with arranging

quality remote education. Hence, we acknowledged the puzzling situation faced by the educators and wanted to provide a platform for exchanging ideas for the development of remote learning and teaching practices. Bearing this in mind, the first webinar focused on the experiences and good practices of remote craft pedagogy, while the second webinar focused on future visions of remote craft education. Both three-hour webinars included two expert presentations, discussions, and group work sessions. The webinars were organised via the Zoom video conferencing platform.

Because this is the first study on remote craft pedagogy, we wanted to collect data about it across various sectors and levels providing craft education. The participants included teachers from elementary and lower secondary school, vocational education, university-level teacher education, and liberal adult education and basic art education in crafts. In addition, student craft teachers participated in both webinars. Altogether, 257 participants (138 in Webinar 1, 119 in Webinar 2) took part in the webinars; most of them engaged in both webinars, but some only participated in Webinar 1 or Webinar 2. We aimed to collect data from the webinar groupwork sessions; however, not all participants engaged in the group work but left the webinar at that stage. Table 1 provides an overview of the webinar participants and group work organisation. In the first webinar, 75 group work participants were divided into 18 groups (3–5 persons per group) via the breakout room function in Zoom. According to their feedback, we enlarged the group size for the second webinar to enable more active interaction in the groups. Thus, 48 group work participants in Webinar 2 were divided into nine random groups, with 4–7 persons in each.

Table 1

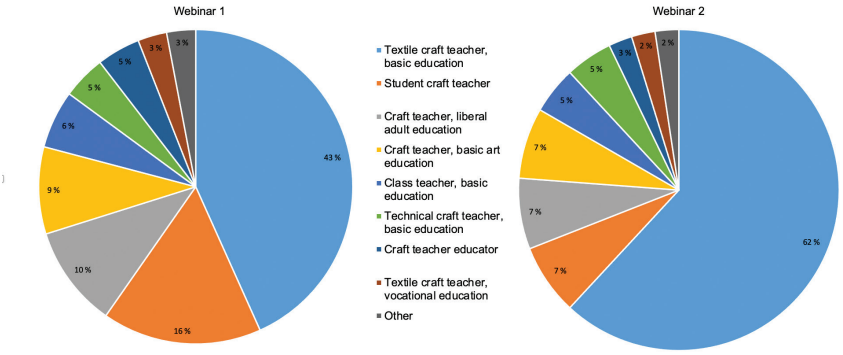
Webinar participants and group work organisation

Webinars	Webinar participants	Participants in groupwork	Number of groupwork documents	Group size	Group task
Webinar 1	138	75	18	3–5 persons	Implementation and impacts of remote craft pedagogy
Webinar 2	119	48	9	4–7 persons	Future visions of remote craft pedagogy
Total	*257*	*123*	*27*		

Most of the group work participants (Webinar 1, 43%; Webinar 2, 62%) were subject teachers from basic education, with an educational background and teaching experience in textile crafts (Figure 1). Also, teachers from other sectors represented mainly textile crafts. The participating student craft teachers were undertaking combined crafts, expertise in both textile and technical work. As organisers of the webinars, our teaching and research context is within craft science and craft pedagogy in general; however, our background and experience derive mostly from the field of textile crafts. Although the webinars targeted all craft teachers, our expertise and networks based on textiles might have produced slightly more textile craft-oriented content and audience.

Figure 1

Webinar group work participants



Data and analysis

The data consist of the material the participants produced in the group work sessions during the two webinars. In the first webinar groupwork task, participants were asked to discuss and write down how they had been implementing crafts during the pandemic, with guiding questions interested in 1) study assignments; 2) teaching methods; 3) digital platforms and tools; 4) craft materials, tools and equipment; and 5) support on interaction. In addition, each group was asked to propose an outline for a remote craft task based on the topics, themes, and phenomena that came up in the discussions. As an outcome, each group produced an online document on the implementation and impacts of remote craft pedagogy.

In the second webinar, the groups were provided with the classical thinking tool 'six thinking hats' (De Bono, 1985) as a framework for their task.

The participants were asked to consider their visions of remote craft education by mentally wearing and switching 'hats' from six viewpoints, contemplating 1) the facts; 2) positives and probe for value and benefit; 3) risks, difficulties and problems; 4) feelings, hunches and intuition; 5) possibilities, alternatives, and new ideas; and 6) management of the thinking process (De Bono, 1985). As an outcome, each group produced an online document on the prospective views and visions of remote craft education. Altogether, the two webinar groupwork sessions produced 27 documents on the pedagogical practices and perceptions of remote craft education considered as the data for the study (Table 1).

The first stage of analysis involved pre-coding (Table 2) the material from the first webinar. In this stage, each group work document from the first webinar (n = 18) was coded inductively (Krippendorff, 2004; Kyngäs, 2020) into nine categories using Atlas.ti software (Friese, 2012).

Table 2

Pre-coding scheme, listed based on the appearance of expressions

Pre-code	Consisting of n expressions
Implementation of remote pedagogy	91
Remote learning phenomena or learning tasks	90
Remote learning platforms and digital tools	73
Confrontations, demands and limitations within remote craft pedagogy	57
Materials and resources for remote craft pedagogy	51
Social interplay and means of communication during remote education	43
Situational modification of pedagogy	37
Learning arrangements and methods	31
Advantages and benefits for remote craft education	18

The categories were not exclusive, which means that data excerpts may have included details representing different categories. For instance, the expression 'I made teaching videos on YouTube that I linked to students in connection with assignments' (W1:G4) is associated with four pre-codes, consisting of implementation of remote pedagogy, remote learning platforms and digital tools, social interplay and means of communication during remote education, and learning arrangements and methods.

In the second stage of the analysis, the pre-codes were refined one by one, and the descriptive content of each pre-code was re-categorised based on the content of the expression. Some pre-coded categories appeared to be richer

in content and more comprehensible in the description regarding the critical points of the data. At this stage, three core categories were formed: 1) challenges, 2) opportunities, and 3) ways of interaction. Each core category consisted of smaller subcategories and themes (Appendix 1). Content-wise, challenges and opportunities came up as contrary core categories, which divided the data into positive and negative attributes. In addition, the data consisted of rich and layered attributes regarding reciprocal learning activities, technology-enhanced communication, and means of giving and receiving feedback. These could not be categorised as either positive or negative effects of learning; instead, they revealed experiences and ideas of change relating to interaction amid remote education. The initial analysis guided the planning of the second group assignment. Consequently, we regard the smaller data set collected from the second webinar (i.e. nine groupwork documents) as complementary to the initial analysis, and the data were categorised accordingly.

Our own subjective experiences of teaching craft remotely might have affected the methodological decisions of the present study. On the one hand, our experiences helped us create a setting in which we could collect reliable and valid data. On the other, our ambition to develop remote and digital craft pedagogy might have provoked us to highlight the positive attributes in the analysis. While aiming for an academically sound empirical study, we also wanted to provide research-based evidence that remote craft pedagogy can and needs to be developed. However, we aimed to ensure the reliability of the study through transparency of the analysis and interpretation. When presenting the results in the following, the data excerpts are identified by codes based on the order of the webinars (W1 = Webinar 1, W2 = Webinar 2) and documents produced during the group work (G*n* = group, number of the group).

Results

Challenges of remote craft pedagogy

Differentiation in and across craft subjects

The educators across the craft sector described complex and diverse concerns regarding the extensive digital transformation required to adapt craft pedagogy to an online learning environment. One of the main concerns for the teachers in basic education was that the skills and capabilities of young students were not sufficient for online learning where the teacher's direct guidance was not readily available. On this note, craft teaching for younger students was regarded as challenging because of the students' low level of basic craft skills and

lack of technological competences. Difficulties in remote craft pedagogy were also reported in relation to students' linguistic challenges. Coincident issues were also addressed in other levels of education, for instance, in relation to the insufficient technological competences of older adults undertaking crafts in liberal adult education.

In addition, challenges were reported in terms of the unequal distribution of material resources across schools, classes, and regions. In mid-March, only a week before the school closure, the Finnish National Agency for Education recommended that school staff and teachers were advised to counsel students to take home materials and equipment they might need for remote studies and for independent work (FNAE, 2020). Many schools provided students with small material packages containing basic materials for crafting, such as needles, yarns, cloth, wood, and nails. Some students could take their unfinished craft projects with them and continue their craft learning processes at home. Some teachers reported that they managed to deliver material packages for some students, classes, or learning groups, but not for all. Sometimes teachers experienced difficulties delivering the materials since students were unable or unwilling to fetch them from school. There were also differences in the material resources of students' homes across the country. Teachers reported that craft materials and tools were readily available in homes in rural areas. In contrast, teachers in urban areas assumed that schools were the only source for specific craft materials, as only very basic equipment or materials (e.g. scissors and cardboard) were found in students' homes.

The role of crafts in the context of other school subjects in basic education was discussed. Several teachers reported that subjects other than crafts were given priority in teaching, and some schools did not teach crafts remotely. We see this as reflecting the greater value given to the so-called academic school subjects, such as mathematics, the mother tongue, and sciences (Nussbaum, 2010). The teachers had noticed that craft learning tasks were regarded as somewhat voluntary and, therefore, they were undertaken only if the families could support remote learning. These accounts are in line with a study of parental support during remote learning, concluding that many children, regardless of their age and capabilities, who would have normally pursued learning rather independently, were in urgent need of extra support during the Covid-19 outbreak (Koskela et al., 2020). The teachers in this study described that craft learning tasks required particular attention and expertise from the parents because the material practices of the subject and craft were, at times, regarded as 'an 'extra' for both schools and homes, and too burdensome when parents had to participate' (W1:G8), as argued by a teacher in basic education. Without a

doubt, it would be unrealistic to expect parents to be capable of expert guidance in the remote education of crafts (Freedman & Escaño, 2020). Some teachers reported that some parents, as well as the school authorities, were not appreciating the pedagogical value of the material and experience-based practices of craft education. Learning based on creative activities, such as craft projects, is more challenging to perceive and evaluate than learning taking place through structured textbook activities. In the challenging situation caused by the pandemic, this might have negatively affected the value given to craft education. All in all, the data analysis revealed that resources for remote craft education varied greatly, which ultimately created inequalities between students, classes, schools, and areas, resulting in a situation where some students were provided better possibilities to cope with pandemic craft pedagogy than others.

Changes in teaching practices during remote education

Practices for implementing and organising craft education during the Covid-19 outbreak varied at different levels of education. In our study, the class teachers in elementary education reported that they usually met the pupils online every day. These meetings were arranged with the whole class being present or as individual student guidance sessions. In lower secondary schools, remote education was most often arranged in different subjects taught by respective subject teachers at a scheduled time. In vocational education, university teaching, and liberal arts education, the course meetings were also arranged at a scheduled time.

According to the teachers' descriptions, craft lessons were mainly constructed similarly throughout the remote education period at different levels of education. The learning tasks were most often given at the beginning of a session, with the teacher's instructions comprising a weekly assignment and an overview of the materials and tools needed for the learning task. After the general information and learning assignments, the students could stay online or start working on the assignments on their own. Many educators across the craft sector reported having arranged lessons with an open meet channel during the scheduled session so that the students could ask for help if needed.

Digital competence is regarded as one of the main challenges the educational community faces (e.g. Garzón Artacho et al., 2020), and this became evident in our study. The planning of remote craft pedagogy was considered more time-consuming than normal classroom teaching (see, also, Iivari et al., 2020). Educators reported having felt inadequacy and experienced remote craft pedagogy as 'scrambling at a fast pace' (W1:G6), which, they assumed, could 'compromise the quality of teaching, among other things, due to a lack of materials and tools' (W1:G18). A general opinion among the educators, frequently

repeated in the data, was that crafts were not suitable for remote education in an optimal way, since 'crafts is a know-how subject where learning requires contact and hands-on working' (W2:G1). The educators also reported that learning and teaching new skills in online environments was impractical and laborious. They felt that when hands-on teaching was absent, there were less familiar pedagogical tools for managing the material practices of the subject. Many teachers put effort into writing feedback to the students, which required time allocation and effort. They also argued that 'habituated video conferencing practices were monotonous and the enthusiasm for students' task returns was poor' (W1:G5). We see this as reflecting the fact that the emergency remote pedagogy did not allow the teachers to prepare their pedagogy thoroughly. In their study on online teaching, Ilomäki and Lakkala (2020, p. 75) point out that this kind of teaching 'requires specific knowledge of pedagogy, content, and technology, compared to situations in which the teacher meets students face-to-face'.

The analysis indicates that the teachers had created individual coping strategies. In most cases, learning tasks were constructed as weekly or bi-weekly tasks, especially for older students. Younger students were often given their assignments daily. However, many responses insisted that remote craft education was experienced as scattered and disorderly, lacking a sense of purposefulness and long-term task orientation, which teachers are normally accustomed to when aiming to reach the targets of the crafts curriculum of basic education (FNBE, 2016, p. 772). Moreover, the fact that the duration of the pandemic was not known complicated efficient planning, as was argued by a group of teachers in their reflection on the beneficial outcomes of remote craft education: 'Remote education could be consistent and worthwhile if there were a proper plan, and the shift to the remote education would not be so sudden' (W2:G3).

Constraints imposed by tasks and materials

The educators reported having responded to the new situation by adapting and adjusting the curriculum-based learning tasks, dividing tasks into smaller assignments, and developing variations, which required them to change from holistic problem-based learning tasks to accomplishment-based, and sometimes mostly theoretical, tasks. It was reported that the role of hands-on making diminished, and tasks focusing on designing and planning, as well as assignments concentrating on material studies, increased. When trying to reach the curriculum targets, the teachers often used ICT to continue their normal pedagogy, reflecting that the teachers did not have time to prepare for the abrupt situation. However, it is essential to develop pedagogy suitable for utilising digital technology for teaching to be efficient.

In our study, the teachers from basic education continued to follow the general curriculum goals of craft education. However, the response to the goals was reoriented, as the importance of online learning was emphasised, and the contents of the tasks were reassessed. To avoid misunderstandings, educators across the craft field reported having acknowledged students' need for clear instructions. More written assignments were given at the university level, and the students were expected to have access to the materials and tools for producing crafted coursework. In liberal arts education, remote craft classes were mainly based on students' independent work. Some craftwork assignments could be completed at home, but some techniques, such as weaving or pottery, were 'difficult to implement without proper tools and materials' (W1:G3), as was argued by the liberal adult education teachers.

If material packages were not delivered, resources for crafting became increasingly limited. In particular, teachers working with younger students were often concerned about the conditions for learning. Safety is an important prerequisite for all education, and the teaching of crafts requires special safety considerations (Inki et al., 2011). The teachers reported having worries about the safety of the students, as 'retrieving [natural] materials [outdoors] may not be safe' (W1:G3), and concerns about craft assignments, which required the students to operate with scissors, knives, or other handicraft tools. Nevertheless, some teachers commented that online craft education was taught 'just as normal' (W1:G7), emphasising that the phases within the remote craft learning process remain comparable to those of the normal classroom pedagogy. However, educators across the craft field felt that learning in online environments required more concentration from both students and teachers than in face-to-face sessions.

Opportunities for remote craft pedagogy

Digitalisation broadening understanding of the craft subject

Although digital tools and technologies have been used extensively in Finnish schools (Mannila, 2018; Niemi et al., 2013), classroom teaching and learning methods have not changed remarkably (Hakkarainen et al., 2015). According to a recent large-scale investigation in Finnish schools, the creative use of digital technologies, such as digital designing or fabrication, or programming, has remained scarce (Korhonen et al., 2020; see also Laurell et al., 2021). Although some subject-specific digital tools, such as 3D printers and laser cutters, have been utilised in craft classrooms and maker spaces in recent years (Bosco et al., 2019), digitalisation was not profoundly integrated into Finnish craft learning before the Covid-19 pandemic.

During the Covid-19 outbreak, the participants in this study used an extensive range of digital platforms and applications to sustain remote craft education: live classes were held via video conferencing and VoIP tools. Instructions were delivered through messaging on WhatsApp and remote communication web services, such as Wilma and Helmi. The outcomes of the learning processes were mediated via digital distribution platforms, online portfolios, and learning assessment tools. In addition, interactive platforms were used to support students' peer interaction. In adult education, meetings are also extended to live sessions.

Educators used different tools and platforms depending on the situation; their own digital skills, competences, and readiness to use technology; and the resources provided by the institution. The schools' guidelines were not unified either; for instance, some teachers were not allowed to use Zoom or Google accounts due to security issues. However, educators generally felt that they eventually succeeded in coping with the digital interface, adopting new tools and technologies to craft pedagogy, and choosing best practices according to the goals of education. This is reflected, for instance, in a response of a lower secondary school teacher, in the request to give orderly instructions to students in their online craft learning tasks: 'Practices [for instance in returning craft assignments] should be clear and more or less the same every time, so the students won't get mixed up with too many instructions and platforms, where to document what as their response to a learning task' (W1:G13).

The Finnish craft curriculum emphasises the importance of good planning and process documentation (FNBE, 2016, p. 774). Moreover, with the transition to an online environment, the documentation of craft processes has gained more attention. Overall, educators across the field considered augmenting the documentation of craft processes with photos and videos to be beneficial. When thinking of future remote craft education, the educators even envisioned that project documentation could be arranged in craft subject in video format, for example, in a type of '5-minute crafts video' illustrating phases of crafting. All in all, process documentation and reflections appeared to be decisive in mediating knowledge between the students and the teachers during remote education and provided valuable support for learning and teaching crafts.

Empowerment in action: student-centred craft learning

In terms of the learning tasks given by the teachers, crafting was widely linked to students' own lives, home environments, and personal interests. Some craft learning tasks were inspired by the phenomena derived from leisure activities and popular culture of this age group and students' homes and neighbourhoods.

These examples given by the craft teachers refer to meeting the pedagogical objectives of craft education (Pöllänen, 2019) when the students considered a range of design constraints in their crafting and eventually evaluated the outcomes of the process. In this way, craft learning during remote education appeared to promote an understanding of real-world problem solving and enhanced the integration of skills in various contexts from the students' perspectives.

Some liberal adult education teachers provided students with packages of craft course materials. Interestingly, they argued that the demand for materials in liberal adult education courses increased compared to the pre-pandemic situation. When almost all of society came to a standstill, crafting thrived as a hobby, positively contributing to life through times of stress, as 'there was more time for crafting' (W1:G7). Thus, according to the educators, pandemic craft education within adult education seemed to provide much-needed empowerment for people stressed by social distancing.

The teachers recognised that the students could focus on studying at their own pace in their own private spaces at home without the interruptions and distractions that usually occur in classrooms. Furthermore, these examples revealed that remote craft pedagogy allowed the students to personalise their learning with available resources, which enabled malleable craft learning tasks, where the evaluation of the process was based on the learners' interpretation.

The rise of sustainability thinking through crafting at home

One of the most decisive recent changes within Finnish craft education concerns the aim to create diverse, multi-material, and in-depth learning tasks for the students (Kokko et al., 2020; Porko-Hudd et al., 2018; Pöllänen, 2019). One of the strengths of remote craft pedagogy revealed in the current study was the versatility of learning perspectives. Many educators had implemented craft learning tasks within broad areas, such as recycling, material knowledge, and global education. In addition, craft learning tasks often addressed real-life challenges, such as fixing skateboards or mending clothes. In general, the learning tasks during remote education comprised assignments on complex local and global phenomena. Thus, the students were encouraged to learn artisanship from a sustainability perspective, as they were not buying new materials but utilising existing ones, engaging in 'every day, homely creativity with which to look at things differently' (W1:G10). Many projects were based on the 'making it from scratch' mentality' (W1:G4), utilising materials readily available in homes, grocery stores, and nature.

In basic education, learning was often grounded on themes including 'coziness, functionality, maintenance, and recycling' (W1:G10), and sustained

with craft assignments concentrating on upcycling, décor, and maintenance at home, or tasks focusing on students' wardrobe or style, such as wardrobe inventories or arrangement tasks. With the help of ready-made e-learning materials – most commonly retrieved from the craft learning database PUNOMO (https://punomo.fi) and the websites of craft teacher organisations – teachers constructed various learning tasks for crafts. These tasks included activities such as face mask sewing, insect hotel building, bicycle maintenance and cleaning the water trap from the sewer. There were also assignments for researching crafts by searching for information, such as learning about craft traditions and discussing them with grandparents.

At times, craft learning relied on parental support and the housework done at home. Sometimes the learning tasks were integrated with other school subjects. As described by a lower secondary school craft teacher, 'wooden boards for making flamed salmon [which were accomplished during the Covid-19 remote teaching] were set for trial, and I got photos of real uses of the boards in May. At that point, craft learning was integrated with home economics, and I asked about tasting and possible side dishes for a salmon meal. Parents were also nicely involved in this additional task' (W1:G18). The teacher gave this as an example of a successful remote pedagogy assignment, which integrated crafts with other school subjects and contributed the perception of the meanings of crafts in everyday life so that the parents could be involved in the students' learning process. All in all, collaboration with parents in regard to materials and conditions for craft learning was considered a meaningful practice often neglected in craft education.

Interaction in remote craft pedagogy

Teacher leadership in communication and interaction

Although craft learning is essentially student-centred, our analysis suggests that remote craft education tends to be teacher-led. The teachers reported that written assignments and commenting on them took on an emphasis over hands-on making. Although teachers gave more written feedback and tailored their teaching to support the students, the interaction was often teacher-led.

The unexpected situation caused by the pandemic enhanced collaboration between craft teachers. Responses indicate that there was more cooperation between the technical and textile craft teachers in many basic education schools during the Covid-19 outbreak compared to the pre-pandemic time. Sometimes the content of craft lessons was divided week-by-week between textile work and technical work taught by respective teachers: 'Every other week

students undertook tasks in technical work, such as bike maintenance, and every alternate week in textile work, such as ironing' (W1:G10). The craft teachers reported having intensified collaboration to reach the common targets and to cope with the difficult situation, as reflected in the following:

> 'There is a need to develop new ideas for craft pedagogy and look afresh at education organised from a distance. It is not just thinking about how I would implement contact teaching remotely. Forms of remote education should be developed collaboratively in a coordinated way so that there is peer support for developing new methods for changing education' (W2:G5).

The educators had developed new routines to overcome the challenges related to remote craft teaching. Some of them even insisted on including collaborative lessons if the remote education period continued. In addition, teachers wished for deeper collaboration between craft teachers across schools, stating that

> 'sharing materials and ideas should be freer and more easily accessible' (W2:G2).

Most participants in this study reported that interaction was hard to maintain online. Particularly at the beginning of the outbreak, the situation was regarded as difficult and stressful. There were experiences of setting up new routines for overcoming the challenges related to remote craft teaching. Educators were readily developing their methods for remote teaching during Covid-19, dividing large study groups into smaller groups, and setting up one-to-one supervision with students. The overall goal was to have all students present and keep their workload reasonable.

More personalised feedback from the teacher – less peer interaction among students

It has been argued that remote education has increased awareness of the technology affordances for learning, including better opportunities for giving feedback to students (Giovannella et al., 2020). Indeed, teachers in this study also reported students receiving more personal feedback during remote education than before, both in writing and via video conferencing tools or one-to-one messaging. In essence, teachers spoke about personal student guidance and good conversations over the phone or via Meet 'when there wasn't the same rush as there often is during the hours working with a large group' (W1:G14), and that students enjoyed receiving specific, personalised feedback.

Interestingly, educators recognised that contact with some students was even better during remote education than before. When the students collaborated online, for instance, retrieving information on the internet and posting their findings on a shared community platform, all students could have their comments and ideas visible and equally delivered on the screen.

Supporting students' peer interaction in remote pedagogy is a frequently raised challenge revealed in the research (Ilomäki & Lakkala, 2020). In this study, the interaction between students alternated from vivid conversations to complete silence. Teachers acknowledged that when the interaction among the students was text-based, it was not easy to generate conversation. In group situations, the conversation was often stiff and tense. In essence, the educators felt that they lacked the tools to support and sustain interaction. Therefore, attempts were made to encourage interaction and peer feedback via video meetings, chats, and questionnaires.

> 'There were many kinds of interactions in varying circumstances. In upper secondary school, the initial fatigue came to the students after about a month. Some took advantage of distance learning as an opportunity to laze, and they weren't very active after a month. Much depended on the student' (W1:G14).

Challenges in supporting interaction also concerned adult education. In vocational education, some textual assignments were based on peer feedback and thus required student interaction. At the university level, the teachers reported experiences of speaking to a blank screen and their success in creating interaction during a feedback session when the students presented their work. All in all, teachers experienced difficulties in getting all students to be online simultaneously, and students often remained distant and quiet during the online group meetings.

Generally, it was experienced that the younger the students were, the more interaction there was during online teaching. However, the interaction was also vibrant in liberal adult education, where learners dwell in a human-centred pedagogical frame. Acknowledging that interaction flourished in situations where the frame for teaching and learning was open-ended and adaptive paves the way for developing meaningful pedagogical practices for remote craft education.

Discussion

The prevailing experience of the study participants was that arranging remote craft education had caused an enormous workload for the teachers. In fact, according to Kin-Singh (2020), pandemic pedagogy has increased the workload of creative arts teachers, in particular, who have worked hard to invent new pedagogical solutions to teach these subjects remotely. Therefore, in their attempt to reach the targets of the curriculum, the educators of this study needed to rethink all aspects of their pedagogy, including the availability of craft materials, tools, and equipment and reconsidering the space in which the students could practice their hands-on activities. In reflection, they faced new challenges in embracing digital tools to support their students online. After all, the educators shared the idea of crafting as a material practice, which requires face-to-face contact and social interaction between teachers and students.

However, the teachers also reported having developed creative pedagogical solutions that could be utilised later, even after the pandemic crisis. They recognised digital technology's opportunities for more individual student guidance and feedback than the usual classroom environment. In addition, learning assignments were often formulated to cover wider societal and cultural themes than previously in ordinary teaching. Often, the assignments of remote craft education touched the students' everyday lives, involving their homes in craft studies.

Fullan (2020) points out that the education system was, in fact, in need of changes after a long-stagnant period that has allowed education to continue without major changes. He sees the crisis as an opportunity for positive change, although he also sees the risks of the proliferation of technology without good pedagogy being developed in parallel with it. According to Hughes (2020), pandemic pedagogy has forced educators to concentrate on the very core of teaching in their subject area. As Robinson (2020, p. 7) states, we need to think carefully 'what kind of normal do we want to go back to?' as this is an exceptional moment to redirect our course. Obviously, there is a need to educate teachers to find digital pedagogical solutions for their remote pedagogy. As Aguilera and Nightengale-Lee (2020) recognised, the best results are not reached by replicating the existing social practices of classroom pedagogy but by establishing new, more flexible practices for undertaking teaching and learning for the purposes of remote education. In line with these studies, the findings of our study indicate that the pandemic caused craft teachers to create new pedagogical solutions and approaches, such as establishing new digital skills and feedback practices via online platforms, developing a wide range of learning topics centred around sustainability and household, and delivering virtual workshops and classes to sustain collaboration among teachers,

that might be worth keeping up in the post-pandemic era. These new practices of utilising digital possibilities will have a long-term impact on the implementation of craft education.

The analysis revealed the disparities among the range of schools, teachers, students, and homes to attend and implement remote craft pedagogy. This puts them in an unequal situation, which is a serious concern in remote pedagogy both in Finland (FINEEC, 2020) and globally (d'Orville, 2020). Schools have different opportunities to provide their students with adequate materials and tools for remote craft studies. Teachers' and students' abilities to use digital tools differ, as does their access to them. In addition, craft activities put certain conditions on space that each home cannot always be granted (see Arnove, 2020). The teachers in this study were especially concerned about the students with the weakest craft knowledge and poorest technological capabilities, as they could not be supported directly by the teacher.

This study emphasised the earlier findings of the inequities among school subjects, placing the theoretical subjects above artistic and practical subjects in the hierarchy (Nussbaum, 2010). The teachers in this study reported that priority was given to the theoretical subjects, as their teaching was also ensured in emergency remote education. Crafts were often the last subject to be considered, and in some schools, crafts were not taught during the lockdown. Unfortunately, these findings reflect on 'the silent crisis' of the downsizing of arts and humanities that runs through society and the education system, in which the learning of skills is often disregarded in contrast to more profitable subjects that are seen to have a greater contribution to the nation's rush to profitability in the global market (Nussbaum, 2010). In light of research, these findings are alarming, since they have repeatedly underlined the need to cultivate creative competencies of all citizens to meeting the complex global challenges we face today and in the future (Kini-Singh, 2020). Artistic and practical subjects play a key role in developing these competences from the early stages of education since they, through their very premise, focus on creative ways of thinking and acting. Their full potential cannot be justified in terms of what they can do for more theoretical subjects, such as mathematics or science, but rather in terms of what they directly deliver (Hetland et al., 2013). Creative approaches to education have a learning heuristic of their own, where experience-based practices are used for problem-solving, learning, investigating, and discovery. The practices include, for example, mentally envisioning what cannot be directly observed or imagining possible next steps, expressing ideas or personal meanings, exploring playfully without a pre-structured plan, and embracing mistakes as learning opportunities (Daugherty, 2013). Without these practices, many novel and innovative approaches to learning might never be found.

Conclusions

Since the webinars in which the data were gathered were voluntary, we can assume that the data consisted of the views of educators who were interested in developing remote pedagogy and were already keen on developing their digital competences. This may be reflected in the findings regarding the lack of criticism of remote learning technologies. Indeed, as the discussion of teachers' own technological skills and possible shortcomings was left behind in the context of craft teaching, greater value was put on the characteristics, challenges, and opportunities that can constrain, reverse, and mitigate remote learning and teaching practices of the subject. Thus, the findings manage to go beyond user-related technological issues, which are often easy to get stuck in, and, hopefully, underpin the productive policy and practical application of remote craft pedagogy in the future. Consequently, the findings may provide a more positive view of remote craft education in Finland than the situation found in the country in general. Therefore, the findings of this study are not meant to be generalised; rather, the purpose is to reveal the range of aspects related to remote craft pedagogy.

Although the present study's findings revealed both challenges and opportunities in remote craft pedagogy, the general perspective tended more to the negative side. It was challenging for the teachers to meet all the requirements of the craft curriculum via remote education. Furthermore, many important aspects of craft education, such as learning through creative and collaborative material practices, were diminished or even vanished in remote teaching. We conclude that craft education does not adapt well to existing remote education solutions; however, some aspects can be implemented through remote means. For example, providing more individual feedback or including more students' interests in the learning tasks were easier to realise remotely.

As most informants in this study were craft teachers of basic education, their views are emphasised in the findings. Although we touched on the experiences from other educational levels, more research from remote craft pedagogy at different educational institutions is needed. Here, we concentrated on the teachers' experiences and views; research is also needed on the students' experiences and learning outcomes of remote craft education as well as guardians' experiences of supporting children's learning of craft at home. In addition, developing more suitable remote education solutions for craft and other artistic and practical subjects would provide interesting avenues for future research.

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Physics Teaching in Croatian Elementary and High Schools during the Covid-19 Pandemic

Ivana Štibi*[1], Mojca Čepič[2] and Jerneja Pavlin[2]

In spring 2020, 916 elementary schools and 443 high schools were closed in Croatia due to the Covid-19 pandemic and remote teaching was introduced. This had an impact on physics teaching as an experimental subject. In addition to positive aspects concealed in new experiences and work perspectives, the sudden transition from conventional face-to-face teaching to a remote format had an undeniable negative impact on physics teaching in elementary and high schools. In order to mitigate the effects and provide a detailed insight into the problems that arose during this transition, we conducted a quantitative study among teachers of physics in elementary and high schools in Croatia, with the aim of identifying logistical and technical problems and challenges in physics teaching during the Covid-19 pandemic. An online questionnaire with five parts (general data, teaching physics during the Covid-19 pandemic, experiments, sociological component, exchange of experience) was completed by 178 Croatian teachers. The results irrefutably point to the flexibility and responsiveness of physics teachers, an increase in the teachers' workload, a lack of the experimental work that forms an essential part of the subject of physics, and a lack of teacher knowledge (in ICT), skills and equipment for conducting distance teaching. However, it also emerged that online teaching, if carefully designed and individualised, can stimulate additional commitment and interest in the subject among students. The paper presents the research findings in detail, with the aim of helping physics teachers to plan further teaching more effectively as and if the pandemic progresses.

Keywords: Covid-19, distance teaching, experiments, physics, teachers' views

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Poučevanje fizike v hrvaških osnovnih in srednjih šolah med pandemijo covida-19

Ivana Štibi, Mojca Čepič in Jerneja Pavlin

Spomladi 2020 je bilo na Hrvaškem zaradi pandemije covida-19 zaprtih 916 osnovnih šol in 443 srednjih šol ter uvedeno poučevanje na daljavo. To je vplivalo na poučevanje fizike kot eksperimentalnega predmeta. Poleg pozitivnih vidikov, prikritih v novih izkušnjah in delovnih izzivih, je imel nenadni prehod od običajnega pouka v živo k pouku na daljavo nesporno negativen vpliv na pouk fizike v osnovnih in srednjih šolah. Da bi prikazali učinke in ponudili podroben vpogled v težave, ki so se pojavile med tem prehodom, smo izvedli kvantitativno raziskavo med učitelji fizike v osnovnih in srednjih šolah na Hrvaškem z namenom prepoznati logistične in tehnične težave ter izzive pri poučevanju fizike med pandemijo covida-19. Spletni anketni vprašalnik s petimi deli (splošni podatki, poučevanje fizike med pandemijo covida-19, eksperimenti, sociološki vidik, izmenjava izkušenj) je izpolnilo 178 hrvaških učiteljev. Rezultati kažejo na prilagodljivost in odzivnost učiteljev fizike, povečanje obremenitve učiteljev, zmanjšanje količine eksperimentalnega dela, ki je bistveni del predmeta fizika, ter pomanjkanje učiteljevega znanja, spretnosti in opreme za izvajanje pouka na daljavo. Izkazalo se je tudi, da lahko pouk na daljavo, če je skrbno zasnovan in individualiziran, spodbudi zanimanje za predmet fizika pri učečih se. Prispevek predstavlja izsledke raziskave z namenom učiteljem fizike pomagati načrtovati pouk učinkoviteje, če se bo pandemija nadaljevala.

Ključne besede: covid-19, eksperimenti, fizika, pogledi učiteljev, poučevanje na daljavo

Introduction

Subsequent to Covid-19 entering Europe, all schools in Croatia – 916 elementary schools and 443 high schools (Ministry of Science and Education, 2021) – were closed on 16 March 2020, and after a three-day preparation period, the transition to online remote teaching took place. In addition to positive aspects concealed in new experiences and work perspectives (Schröder-Turk & Kane, 2020), this sudden transition from conventional face-to-face teaching to a remote format had an undeniable negative impact on physics teaching, as an experimental subject, at different educational levels (Union, 2020).

The situation of global long-term distance learning does not occur often, and the increased interest of the educational research community is evident. Due to social distancing and the inability to teach face-to-face, teachers transferred their teaching materials to a digital format and converted their teaching methods to remote methods. Moreover, they chose between synchronous and asynchronous teaching. This choice depends on many factors, from sociological to individual (Union, 2020). Although students adapted to remote teaching methods with varying degrees of difficulty (Azlan et al., 2020), the synchronous part of teaching is ultimately more beneficial to students (Guo, 2020), and the face-to-face method is preferred even if ICT is integrated (Azlan et al., 2020, Sindiani, 2020). Furthermore, in the case of physics teaching as an experimental subject (Klein, et al., 2021), discussing problems and designing one's own experiments and/or conducting experiments (collecting one's own data) individually or in groups should be used to the same extent as demonstration experiments in order to increase students' interest and the perceived usefulness (Kireš, 2018; Repnik & Ambrožič, 2018; Snětinová et al., 2018). However, frequently used experiments are often "cookbook-type experiments" that are focused on content knowledge instead of focusing on the learning process, mainly due to the organisational aspect (Haagen-Schützenhöfer & Joham, 2018). In order to avoid this, the authors suggest that teachers undergo professional development (both in ICT and teaching methods) on a regular basis, even in this unusual situation (Walan & Chang Rundgren, 2014).

In order to fully understand the context of the presented research, the organisation of the Croatian education system, which is centrally managed by the Ministry of Science, Education and Sports (MSES), is presented in Table 1. The Croatian education system provides educational services at preschool, elementary school, high school and higher education levels, and is open and available to all on equal terms according to their abilities. In the present article, lecturers who teach physics are called teachers, and learners of physics at all levels are called students. Elementary school is used when referring to seventh- and eighth-grade

physics in the lower secondary level of compulsory school. High school is used to refer to various programmes at the upper secondary level.

Table 1

The Croatian education system

Preschool education	Preschool education is carried out through programmes of care, education, health care, meals and social care for children from 6 months to school age children, divided into three cycles: (1) from 6 months to one year of age, (2) from 1 to 3 years of age, (3) from 3 years of age to the beginning of primary school.
Elementary education	Elementary education includes primary and lower secondary education, organised as a single structural system beginning at age 6 and consisting of eight years of compulsory schooling, delivered through the network of "elementary" schools.
Upper secondary (high school) education	Upper secondary (high school) education is not compulsory, but almost all students enrol in upper secondary general education or vocational programmes (allowing students to acquire knowledge and skills for work and for the continuation of education). These programmes are offered by the network of "middle schools". – Grammar schools (4-year general education programme): completed by the state Matura examination; – Vocational schools (4–5-year vocational education programmes or 3-year vocational education programmes): completed when the final paper is prepared, submitted and defended in a process organised and conducted by the school (duration at least 4 years) or – Art schools: completion conditions as for vocational schools. If a student of art or vocational education programmes lasting at least 4 years wishes to continue his/her education at a higher education institution, he/she is required to take the state Matura examination.
Higher education	Higher education is divided into two parts and consists of: – University study programmes, which prepare students for academic or professional careers in the public and private sectors; – Professional study programmes, which provide students with an appropriate level of knowledge and skills to enable them to work professionally and be directly involved in the work process.

Note. Adapted from Eurydice, 2021.

In order to better understand and interpret the research findings, we also need to look at the recommendations that teachers received from the MSES, as well as their timeline. Official MSES documents first published on 11 March 2020 provide guidelines for primary and secondary schools regarding the establishment of distance education, stating that virtual classrooms should be established by 16 March 2020 involving all students of a given grade along with subject teachers, while parents of students in lower grades should also be involved in the virtual classroom (Ministry of Science and Education, 2020, 11 March). The next document is dated 13 March 2020 and states that on 16 March 2020, "School on the Third Channel" should launch and the virtual classrooms set up should be functioning.

The recommendations also address the work of teachers and the school, as well as the care of students who cannot stay at home (Ministry of Science and Education, 2020, 13 March). In an amendment to the previous decision of 19 March 2020, the section concerning the teacher's work is changed, stating that s/he should work from home and should be provided with all of the necessary infrastructure for distance education (Ministry of Science and Education, 2020, 19 March). The last of these key documents is the distance education assessment guidelines, which state, among other things, that formative, not summative, assessment is preferred, and that teaching should not be done in real time via video conferencing due to network and system overload (Ministry of Science and Education, 2020, April).

In order to mitigate the negative impact and provide a detailed insight into the problems that arose during the transition from face-to-face to remote teaching, a quantitative study was conducted among physics at elementary and high schools in Croatia. Its aim was to identify logistical and technical problems and challenges in physics teaching during the first cycle of the Covid-19 pandemic (spring 2020).

Research problem and research questions

In the short time of the Covid-19 pandemic in the spring of 2020, teachers had to transform their "in paper" and "in vivo" teaching materials into remotely applicable materials that similarly motivate, encourage and sustain student interest long enough for them to construct new knowledge (Kluge, 2014; Sullivan et al. 2017).

This adaptation is time-consuming for most teachers, as only a small proportion of them have prior experience in using ICT in some way (Kluge, 2014). In addition to the transfer of materials (digitalisation), there is also the problem of preparing a "Plan B" for unexpected problems such as the overload of educational platforms. It takes time to divide the teaching materials into smaller parts to ensure a clear structure of knowledge and to maintain students' concentration, as well as to appropriately moderate students' homework and reading requirements, while also organising discussion sections after self-learning so that students can share their understanding of the materials (Bao, 2020). In some countries (including Croatia), educational broadcasting is used to support remote teaching (especially for those who do not have internet access) or simply to align teaching methods and materials across the country (Union, 2020).

Among the many problems facing the educational process during the Covid-19 pandemic, we focus particularly on the impact of lockdown on physics education, as physics is an experimental subject that could be affected in additional ways, or affected differently, compared to other subjects. Since the problem is so broad, six research questions focusing on physics teaching were posed in

order to explore the impact of prolonged absence from school and alternative ways of teaching physics/conducting experiments and assessing knowledge.

- RQ1: How has Covid-19 affected physics lessons?
- RQ2: Which topics were taught and how extensively were they taught?
- RQ3: How was experimental work carried out during remote lessons?
- RQ4: How did Covid-19 affect assessment of students' physics knowledge?
- RQ5: How did teachers perceive the workload during the remote teaching period?
- RQ6: How was communication with students carried out during and alongside physics lessons?

Method

Research related to physics in the Covid-19 era in Croatia was developed in spring 2020. The study used a descriptive pedagogical research method and a quantitative research approach, taking into account all of the advantages and disadvantages of certain methods in physics education research (Hodson, 2014; Milas, 2005).

Sample

During May and June 2020, an online questionnaire was completed by 178 Croatian physics teachers (71% female and 29% male) from all over the country. Participation in the survey was anonymous and voluntary. The age structure of the physics teachers as a whole and divided by school level is presented in Table 2. It can be seen that the majority of the physics teachers are between 30 and 50 years old. The length of service of the physics teachers is shown in Table 3, where it is evident that about 60% have from 10 to 30 years of experience in education.

Table 2

Age structure of the physics teachers

Years	In general (N = 178)		Elementary school		High school	
	n	%	n	%	n	%
Less than 30	15	8	10	8	6	11
30–40	68	38	52	41	20	35
40–50	53	30	38	30	16	28
50–60	32	18	21	16	12	21
60 and more	10	6	7	5	3	5

Note. $N_{\text{elementary school}} = 128$, $N_{\text{high school}} = 57.7$ teachers work in elementary and high school. Alongside the number, the corresponding percentage of the participants is given.

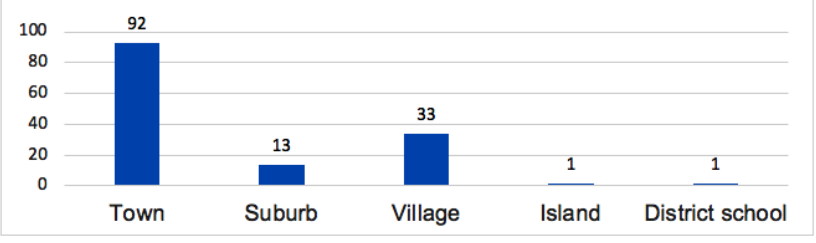
Table 3
Length of service of the 178 physics teachers

Years	In general		In school	
	n	%	n	%
Less than 5	17	9.61	22	12.57
5–10	30	16.95	32	18.29
10–20	69	38.98	65	37.14
20–30	41	23.16	38	21.17
30 and more	20	11.30	18	10.29

Note. Not all of the teachers answered all of the questions. Alongside the number, the corresponding percentage of the participants is given.

Almost 65% of the teachers who completed the questionnaire work in elementary schools, while the others are from high schools. Only seven respondents declared that they work in both educational levels (elementary and high school) at the same time. The questionnaire reached teachers from all over Croatia, 51% of whom were from urban schools (Figure 1). Fifty teachers did not answer this question.

Figure 1
Number of teachers per school stratum



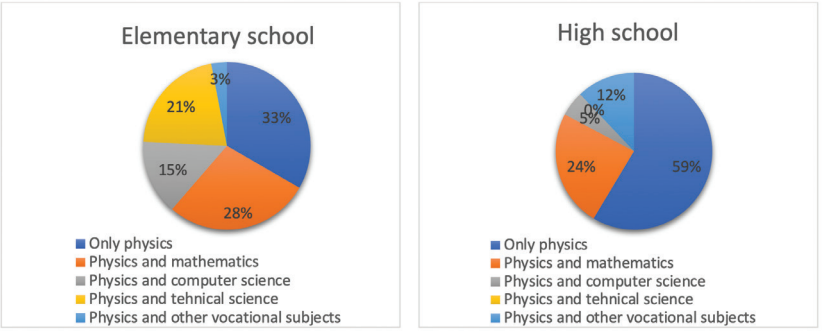
Note. 140 physics teachers answered this question.

Most Croatian universities preparing students to become physics teachers have double-subject study programmes: students can take a combination of physics and mathematics, physics and technical education or physics and comutational science. This allows teachers to fulfil the required workload (24 school hours per week) despite having only two school hours of physics per class per week (Constitutional Court of the Republic of Croatia; Ministry of Science, Education and Sport, 2006, 2014). Nevertheless, most teachers who

answered the questionnaire teach only physics (44%). Many teach physics and mathematics (27%), and some teach computer science, technical science or other science subjects (e.g., chemistry) in addition to physics. Details of the distribution of subjects taught are shown in Figure 2.

Figure 2

Subjects taught by the surveyed teachers during the Covid-19 pandemic



Note. $N_{elementary\ school} = 128$, $N_{high\ school} = 57$ (7 teachers work in elementary and high school). Reflects the percentage of participants answering the question in a certain way.

Instrument

The data were collected using an online questionnaire for physics teachers. In order to develop the online questionnaire, a qualitative study was conducted as the first part of the research, based on semi-structured interviews with five teachers from elementary schools and five teachers from high schools (conventional sampling) (Bornstein et al., 2017), with the aim of gaining insight into the problems and the situation imposed on them so suddenly by the lockdown. The interviews were conducted via mobile phones or video conferencing due to the epidemiological conditions that prevailed at the time.

After the interviews, the questions and problems relevant to the quantitative part were selected and the questionnaire was developed. Data collection was done by means of an online questionnaire consisting of five parts: general data, physics teaching during the Covid-19 pandemic, experiments before and during the Covid-19 pandemic, sociological component, exchange of experiences. The questionnaire has a total of 33 questions, 8 of which are open-ended questions related to the respondents' own experience during distance teaching of physics, the reactions of students and parents to the methods of distance education, and what the respondents will implement in the future from this part of the teaching experience. The instrument used descriptive categories and corresponding Likert scales. For the purpose of this paper, not all of the questions were evaluated (four were left for further analysis).

Data analysis

During the processing of the data, anonymity of the data was ensured for research purposes. After data collection, the teachers' responses were coded and transferred to the SPSS program to perform only basic descriptive statistical analysis at this point. The parametric t-test was used to explain the difference in the quantity of experiments before and during lockdown and not the relationship. The statistical hypothesis was tested with an alpha error rate of 5%.

Results and discussion

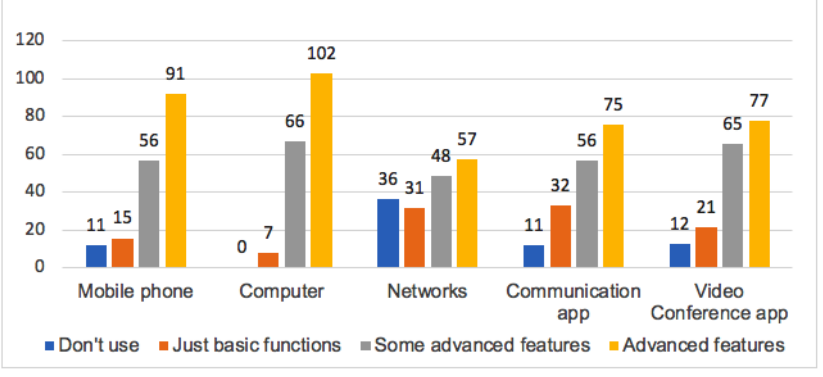
The results and discussions are presented according to the research questions.

- RQ1: How has Covid-19 affected physics lessons?

Given that teachers' ICT knowledge was essential for remote teaching, we investigated the physics teachers' self-assessment of their ICT use. Most of the teachers are very comfortable and confident using all of the ICT needed during online teaching (Figure 3). This is important because the appropriate use of ICT helps to extend and improve the quality of teaching methods and helps to make learning an interesting, active and realistic process for students (Tinio, 2003). The results are similar irrespective of the teachers' school level, elementary or high school. However, social networking sites, such as Facebook, Instagram and the like, are not very popular among the respondents, and they are not very confident in using all of the features they offer.

Figure 3

Physics teachers' self-assessment of their level ICT use



When the lockdown began, the teachers were mostly on their own and had to consider the schedule of their classes taking into account other teachers/subjects and the obligations of their students. Nevertheless, most of them (almost 76%) retained the same schedule of lessons. Others (15%) had lessons at different schedule times (in agreement with the students), while 9% of the teachers had no direct distance teaching.

Apart from having to consider the obligations of the students, there was also a problem of an economic nature. The teachers reported that not all of the students they taught had their own computer or tablet, so they could not follow direct teaching. For example, a simultaneous study with students (our preliminary result), which is not otherwise the subject of this article, shows that 50% of the students shared a computer or tablet with parents or siblings. Teachers also reported that many students did not have adequate internet access. In addition, not all students were able to use the applications selected by the teachers for direct teaching or knew how to use them. All of this represented an additional burden on the teachers' time: they first had to learn how to use the applications themselves, and then had to demonstrate the applications and teach the students, as expressed in the answers to the open questions. A total of 45% of the teachers required students to be present during direct remote teaching: from the questionnaire, the elementary and high school data show that 44% of elementary school physics teachers and 53% of high school physics teachers required students to be present in class.

The previous school year was quite unusual for the Croatian school system. Apart from the Covid-19 pandemic and online teaching during the second semester, there was a long-lasting strike involving the whole school system during the first semester, which resulted in not all teachers following the curriculum at the same pace. When the lockdown began, the topics that teachers were teaching were therefore quite scattered. This problem is evident for the last few subjects of the first semester (Ministry of Science, Education and Sport, 2019).

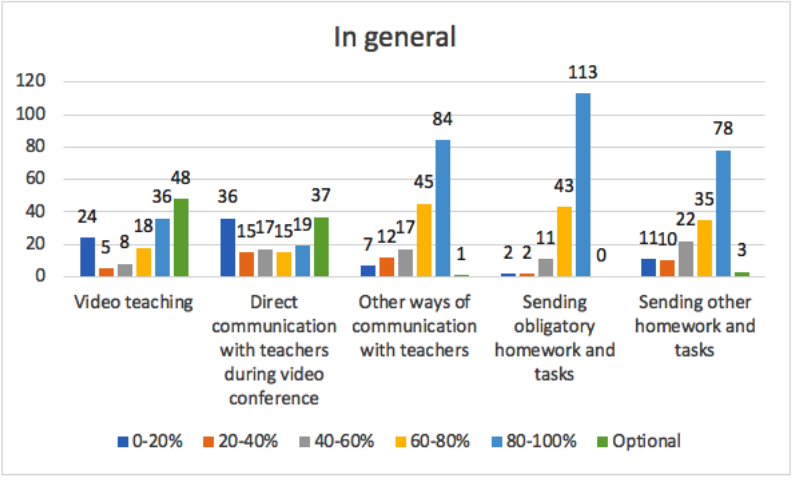
Regularity and students' obligations

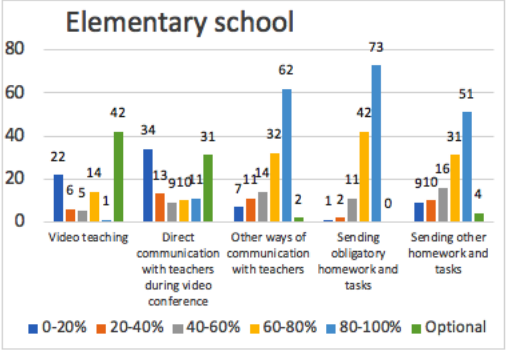
The surveyed teachers also reported on student participation and obligations during online classes. A total of 50% of the teachers did not require students to participate in direct teaching for various reasons, some of which are mentioned above. This was also related to the times when students should either participate or connect to other courses with applications, and to whether students had a computer/tablet/laptop available. Although direct teaching was not compulsory, all other kinds of communication and obligations were

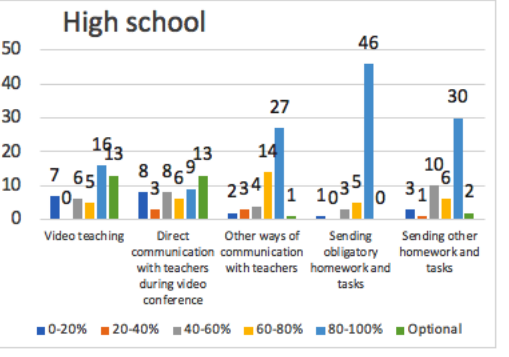
obligatory. Figure 4 shows the same situation for elementary and high school, so the results are general for all participants.

Figure 4

Students' obligations during online physics classes, as reported by the surveyed physics teachers







Note. $N_{elementary}$ = 128, N_{high} = 57 (7 teachers work in elementary and high school). Reflects the number of participants answering the question in certain way.

- RQ2: Which physics topics were taught and how extensively were they taught?

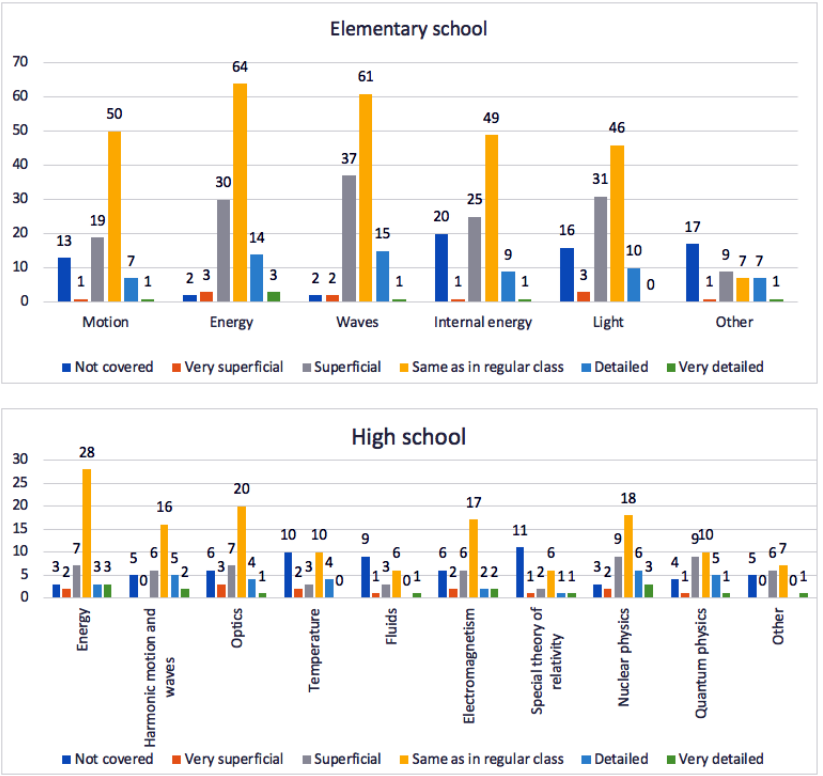
Figure 5 shows which physics topics were taught and how extensively were they taught during the Covid-19 lockdown. The data are given separately for elementary and high school. All of the curricular topics for elementary

school are shown, and about 50% of the teachers believe that their teaching of the topics was similar in detail to that of regular classes. About 10% believe that their teaching was even more detailed, and the rest believe that their teaching of these topics was superficial. In Figure 5, for elementary school, the "not covered" column is high for three topics – motion, internal energy and light – indicating that those topics were quite frequently not taught. For motion, the explanation could be that the teachers had already covered the topic in the first semester (due to the curriculum). A possible explanation in the case of internal energy and light is that the teachers devoted more time to topics covering waves and energy, and so did not have time to cover one or two other topics. Even under regular conditions, many teachers do not teach about light and even internal energy; due to the overcrowded curriculum, teachers tend to focus on the subjects they think are more important.

For high school, the situation is somewhat different. Two topics were mostly not included ("not covered" columns). It is expected that even in regular classes, many teachers do not teach the topic of the special theory of relativity. However, this is not the case for fluids: it is the last topic in the third grade, so last year teachers obviously did not have time for it, possibly because they were focusing on the other topics that were more important to them. Moreover, these answers were expected for topics that are sometimes grouped under the common name Modern Physics (nuclear and quantum physics), either because there are no proper experiments that teachers can do in schools with students under regular conditions, or because the topics are covered very superficially under normal circumstances as well. In addition, this is the last topic in the fourth grade, which means that the same explanation as fluids could apply.

Figure 5

Physics topics taught during the pandemic and the level of detail for elementary and high school



Note. $N_{elementary}$ = 128, N_{high} = 57 (7 teachers work in elementary and high school).

Reflects the number of participants answering the question in a certain way.

- RQ3: How was experimental work carried out during remote physics lessons?

Since experimental work – both demonstrations and laboratory exercises – was very much affected by remote teaching, a comparison was needed. The teachers were therefore asked to rate the equipment of the school in order to establish the context of the experimental situation in the schools before the lockdown. Since the teachers were from very different schools, the results ranged from "not equipped" to "very well equipped" (Table 4). A large number of the

teachers are very satisfied with the experimental equipment in their schools.

Table 4

Assessment of the school equipment for physics lessons by the surveyed physics teachers

	Elementary school		High school	
	n	%	*n*	%
Not equipped	4	3.13	4	7.02
Poorly equipped	18	14.06	13	22.81
Equipped	59	46.09	23	40.35
Well equipped	41	32.03	14	24.56
Very well equipped	6	4.69	2	3.51

Note. $N_{elementary}$=128, N_{high}=57 (7 teachers work in elementary and high school).

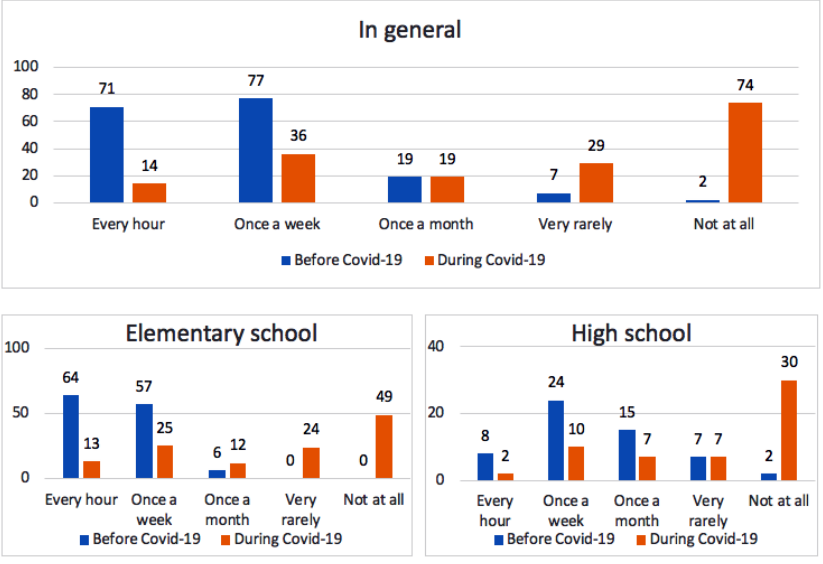
Figure 5 shows all of the regularly scheduled topics for the lockdown period. The yellow column is the most dominant: it is taught in as much detail as in regular classes. What does this mean? As a science subject in the school curriculum, physics is made up of three equally important parts: theory, problem solving and experiments. The prevailing opinion is that physics teaching during the Covid-19 lockdown was conducted in the same manner as when the teacher is in the classroom with the students. This means that physics concepts are introduced as interactively as they are in the regular classroom, that experiments are conducted in the same proportion as they are in the classroom, and that these experiments are not just demonstrative or shown as a picture in a book, for instance (i.e., the students are the ones conducting the experiments) (Cairns, 2019).

Figure 6 shows the results of how often teachers/students conducted experiments before and during lockdown. There is an obvious shift from "every hour" to "not at all". This is very surprising because it is highly inconsistent with the answers to the previous question about the topics taught and how extensively they were taught. Almost 63% of the teachers did not conduct any experiments at all, and 25% of them did so very rarely (perhaps once in the entire period of lockdown). When the data is split between the elementary and high school teachers, it turns out that the situation was slightly better in elementary schools. This may be because the experiments are easier in elementary school and the students can do them independently during regular classes. Examining the data for high school more closely, we see that most teachers do experiments about once every four lessons or even less under regular conditions. However,

if we look at the last two parts of the Figure 6, we see that under regular conditions, "very rarely" and "not at all" are not present in the data for elementary schools, but are present in the data for high schools. The problem of the absence of experiments in physics classes has already been demonstrated (Marušić & Sliško, 2012; Smith et al., 2020). It is also clear from these figures that elementary physics teachers put more effort into conducting experiments during lessons (under both regular and Covid-19 conditions) and that they have done so. However, the question as to why this is the case when the teachers state that they are very satisfied with the school experimental set-up remains to be investigated. Nonetheless, there are statistically significant differences ($t = 15.97$, $p < .01$) in the quantity of experiments in physics lessons before and during the pandemic.

Figure 6

Frequency of conducting experiments before and during lockdown, in general and separately for elementary and high school



Note. $N_{elementary} = 128$, $N_{high} = 57$ (7 teachers work in elementary and high school).

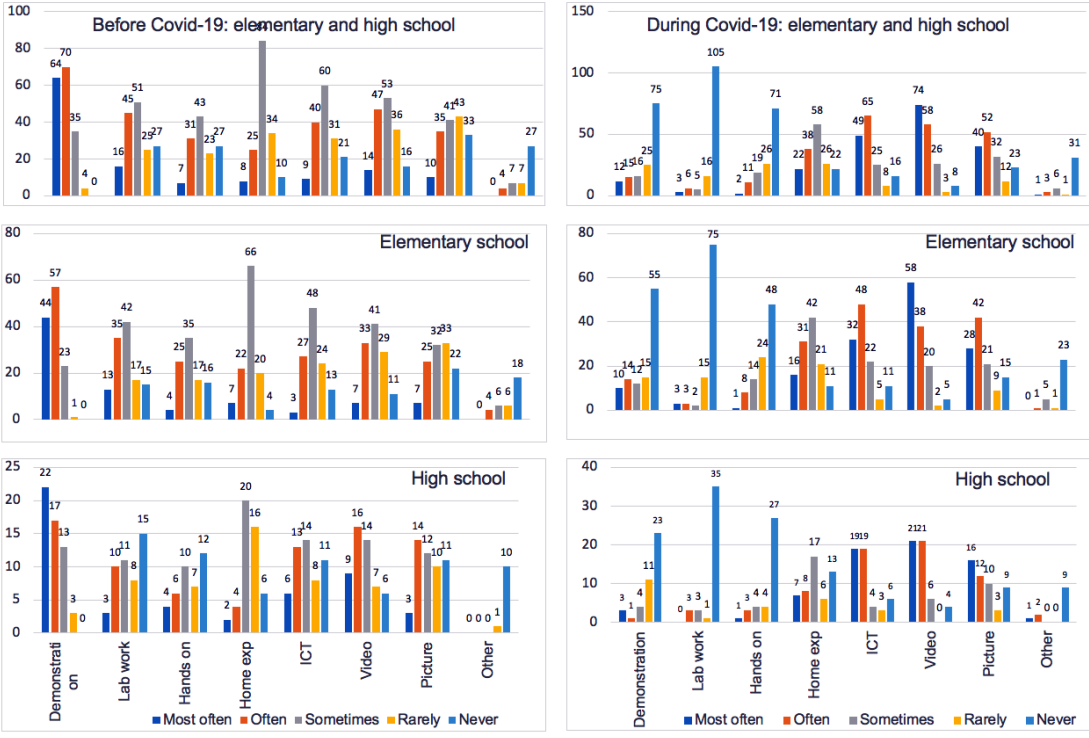
Reflects the number of participants answering the question in a certain way.

In addition to the frequency of conducting experiments, it is also interesting to see what types of experiments the teachers conduct (if any). The data in Figure 7 show the types of experiments conducted in elementary and high

school, both before and during the Covid-19 lockdown. The shift to demonstration experiments is evident, as lab work and hands-on experiments move from "most often" and "often" to "never". Demonstration experiments consistently shift from "never" or "rarely" to "often" and "most often" for video, picture or other ICT. These results were expected due to the sudden change to remote conditions. Moreover, for the type of experiments referred to as home experiments, it is noted that they were conducted "less frequently" during the Covid-19 situation. This was expected in part due to the many additional student obligations during this time, or to the increased teacher obligations and the lack of time to prepare these experiments.

Figure 7

Types of experiments performed before and during the Covid-19 lockdown in general, divided for elementary and high school



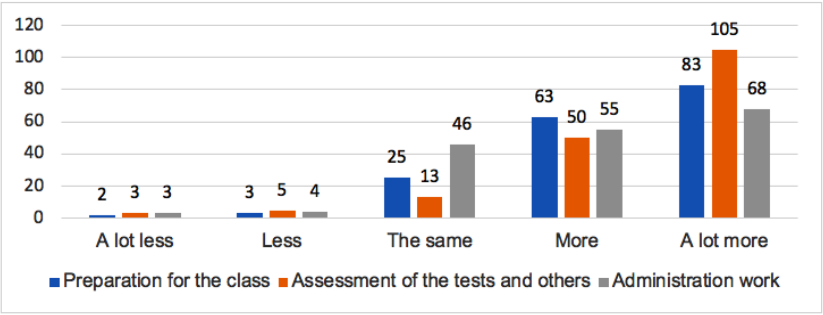
Note. $N_{elementary}$ = 128, N_{high} = 57 (7 teachers work in elementary and high school).

- RQ5: How did physics teachers perceive the workload during the remote teaching period?

Figure 8 presents how teachers perceived the workload during the Covid-19 situation. In every aspect of the teachers' work, they reported that the workload increased (60% of the respondents or more). This could be another reason for not conducting experiments during the Covid-19 period.

Figure 8

Number of answers regarding use of time for specific tasks compared to before the Covid-19 era



Why does this congestion occur? If we recall the beginning of the spread of Covid-19 in Europe and Croatia, it was very sudden, there was no preparation, and the transition to online teaching was announced only a few days before it actually happened. During this short period of time, teachers were left to transfer their materials to an online form, to conduct tests and devise assessment tools, to find appropriate ICT tools and applications, and to learn to use these tools (themselves and their students). The online materials from the MSES and "School on the Third Channel" (especially for elementary students) were a help, as were the prescribed lesson plans for all teachers, but all of this was framed in general, and, as stated above, not all teachers were on the same topic at the same time due to the first semester and the strike. Everything had to be customised for each class, each school and each teacher. This was in fact a major problem. Due to the hourly rate prescribed by the Ministry, one teacher can teach up to five grades, whether the same or different (Ministry of Science, Education and Sport, 2014). In addition to all of this, the school system in Croatia is going through a reform called "School for Life" (affecting elementary school more than high school), according to which teachers are using much more ICT to prepare more interactive and better designed school lessons. Although some of the teachers surveyed reported being familiar with the advantages and

disadvantages of online tools and applications and had used them for some time, they had never used them to teach everything and every lesson in this way.

This could be an appropriate moment to raise awareness about the future of ICT in the teaching process. Teachers should receive quality training to increase ICT competences, both for carrying out experimental work through ICT and for better and greater digitisation of teaching materials.

- RQ4: How did Covid-19 affect assessment of students' physics knowledge?

The teachers assessed student knowledge in all classes, both formatively and summatively (Figure 9) (Black, 1993). Under regular conditions, all teachers know how and when to assess their students (by setting up a yearly plan at the beginning of the school year), but when the situation changed to distance learning, they had to find a new way to assess student knowledge, both formatively and summatively. Figure 9 presents the results of how teachers assess student knowledge and the grades students achieved, averaged per student over one month, both together and divided by school level.

Almost every teacher, from both elementary and high school, gave from one to three grades per student in a month. It could be said that this was very similar to regular conditions, but on examining the assessment evaluation more closely it is clear that the time needed was much longer than in regular classes. The teachers claim that the preparation of quizzes, tests and online homework is very time consuming: they had to prepare more questions and tasks to avoid cheating, they had to choose the proper application that the students know how to use during tests/quizzes, and at the end they had to correct all of the tests obtained through online applications.

Another very important issue is the stability of internet connection for all of the students taking the tests/quizzes. What about questions during direct teaching? How should teachers assess a particular student activity? How should they perform an interactive class in front of the screen, when sometimes watching blank screens instead of students' faces? The teachers reported that students were not allowed to turn on cameras (according to MSES recommendations).

The following are examples of the teachers' statements:

"I taught physics using the Teams application. The disadvantage is that we were not allowed to use cameras according to the Minister's instructions. The advantage is that students were able to solve unclear questions without fear or shame."

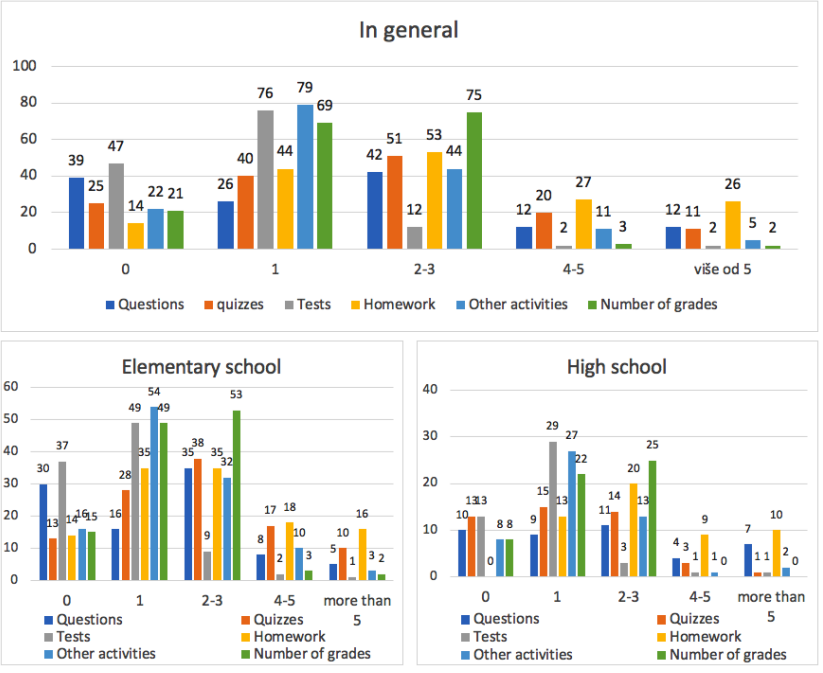
"I have used video lessons of the School for Life, done audio presentations, used Eduvision, used MForms to check knowledge, made video instructions on how to use digital tools in class (children are quite digitally

ignorant; it is a problem is to send mail, to activate an attached link, to use One note), and used Edutorium."
"Problems with connection, materials not delivered, frequent interruptions on both sides, overload, and hours and hours of work on the computer ..."
"We were told not to insist on direct (simultaneous) teaching."
"The problem is that households are poorly equipped with technology and cannot participate in classes!"

It was reported that checking student attendance was difficult. Each student had to turn off the microphone while the teacher was speaking; the microphone was only on when it was the respective student's turn to talk or answer. Due to the internet connection, this can be a very long process, even for only one or two questions per lecture, so how can interactive teaching can be performed in these circumstances? And how can grades be given for the activity during online classes? From all of the data, it is evident that the teachers put a lot of effort into this aspect of teaching physics.

Figure 9

Assessment of students' physics knowledge performed by the surveyed physics teachers



Note: $N_{elementary}$ = 128, N_{high} = 57 (7 teachers work in elementary and high school).

Reflects the number of participants answering the question in a certain way.

- RQ6: How was communication with students carried out during and alongside physics lessons?

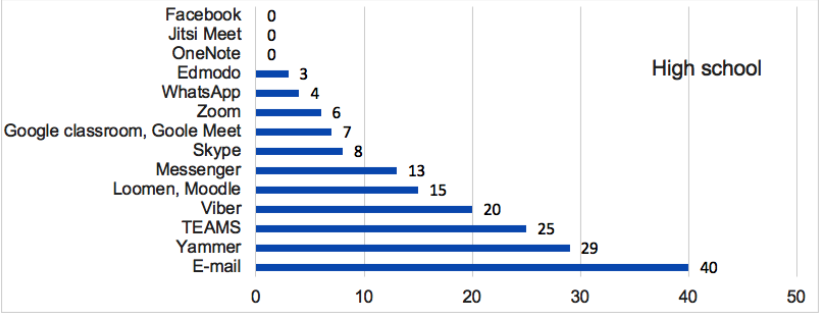
During the time of online teaching, communication with students was crucial for any kind of questions and help. The most common help students asked for was with numerical tasks, homework and experiments, or other tasks that students had to do themselves. This was expected, as it is similar in regular classes, but in online teaching the need for help increased. Teachers therefore put many extra hours into communication. Below are some quotes from the surveyed teachers about what students asked and what kind of help they were looking for.

> *"Additional instructions for tasks, additional explanation of procedures for solving tasks, additional explanation for research work."*
>
> *"Questions on material worked on, instructions on experiments, instructions on individual work."*
>
> *"Most problematic was using the material in conceptual tasks and problem tasks, as well as in regular classes."*
>
> *"They ask for help with everything that would not occur in the regular classroom."*

Figure 10 shows that among the apps for any kind of communication during online teaching during this first days of Covid-19 lockdown, TEAMS, email, Yammer, Viber and Moodle predominate. We believe that this choice was made because of the familiarity of the apps for teachers and students during regular times, so nothing new (or almost nothing) needed to be learned.

Figure 10

Ways of communication between physics teachers and their students, as listed by the surveyed physics teachers



Note. $N_{elementary}$ = 128, N_{high} = 57 (7 teachers work in elementary and high school).

Reflects the number of participants answering the question in a certain way.

Over time, teachers saw other opportunities in other applications, and students had time to learn how to use them. One positive outcome in this regard is that 80% of the teachers surveyed said that they would use some of the applications used during the Covid-19 conditions during regular teaching conditions as well (video lecturers and experiments, quizzes and online tests for repetition, app for communication, like MS Teams, Zoom, etc.).

Finally, it can be noted that in addition to the teaching hours regulated by the timetable (elementary school: 21±4, high school: 21±2), teachers had an additional 22±6 contact hours with students per week in high school, and 15±9 hours per week in elementary school. The standard deviation is quite large because not all of the teachers had the same number of classes (elementary school: 4±3, high school: 6±3) where there is a large discrepancy, nor did they have the same number of students in classes (elementary school: 19±1, high school: 22±3).

Conclusion

This paper presents a Croatian study of physics lessons during the Covid-19 pandemic. The results of the study show the following. Despite all of the problems in organising distance learning, Croatian teachers adhered to the prescribed schedule that applies in regular classes (76%), but were much more flexible in requiring attendance in direct classes during the lockdown (almost half did not require students to be present in direct online teaching). Moreover, the prevailing opinion is that topics were taught in as much detail during lockdown as in regular classes. However, this is contrasted by an apparent shift from the regular conducting of the experimental part of lessons to conducting experiments "very rarely" or "not at all" during the teaching process. A more detailed investigation showed that teachers managed to replace the experimental part of physics lessons during online teaching, covering it with video materials, simulations and a positively larger volume of home experiments. The next contribution of the research relates to the assessment of student knowledge during online teaching. Regardless of all the problems and time requirements, teachers were very active and assessed student activities with a large number of grades (1–3 per month), which is comparable to the numbers in regular classes. All in all, teachers felt quite overloaded with their work commitments, and more working hours were spent on preparation of remote online classes. In the end,

however, 80% of the teachers surveyed believe that even under regular conditions they will use some of the teaching methods they had to use during the pandemic Covid-19 for online teaching in the future.

During the open data analysis, it became clear that although this period of teaching and life in general was difficult and unfamiliar, the active generation of teachers was flexible, adaptable and open to new ways of teaching. They struggled and fought to give their students the maximum and allow them to construct the required knowledge.

Physics teachers have already adopted some online teaching, which is certainly a positive side of the Covid-19 pandemic, and many of them will continue to use such teaching in the future when they return to regular teaching. If online teaching and digitalisation of the teaching process increases in the future and the traditional way of teaching slowly fades away, then this lockdown and the online teaching that is still ongoing (in some form) can certainly serve as a model for how to change and adapt teaching from one form to another in response to circumstances. In accordance with the research results, it can be concluded that it is necessary to increase teacher motivation for lifelong learning and increase their awareness of the importance of the experimental and research process in physics teaching. This should be done by increasing competencies in these two fields, as well as in modern teaching methods and the application of ICT in teaching, which is an indispensable part of the teaching process of the present, and will be especially important in the future. The school's investment in mobile experimental equipment and the use of platforms for virtual and remote experimental work should be the focal point. However, it should be emphasised that the future of the teaching process lies in its digitalisation. In addition, leaving students with an independent research process, which proved to be excellent during the lockdown, should certainly be carried out in both regular and lockdown conditions. For this purpose, the teacher must be well trained and confident enough to become a good mentor and leader of student research and the entire learning process. When a similar situation occurs in the future, more support should therefore be given to teachers during the transition, which should be greatly facilitated by the above suggestions.

During hybrid teaching, it is planned to continue the research to gain a more detailed insight into the use of methods and ICT from the lockdown era and how the transition from face-to-face to online teaching looks now compared to the beginning.

The limitation of the study partly lies in the anonymity of the teachers and the impossibility of additionally interviewing those who are very good at online teaching and those who are just the opposite. Despite this limitation,

answering the questionnaire openly and honestly was more important at this point. Another limitation is the generalisation of the results, which are limited to the sample size of physics teachers.

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We would like to thank all of the teachers who participated in this research despite their busy schedules with students and professional/private commitments during the Covid-19 lockdown.

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Croatian Mathematics Teachers and Remote Education During Covid-19: What did They Learn?

Ljerka Jukić Matić[1]

The study reported in this paper aims to show how Croatian lower-secondary mathematics teachers coped with remote education during the lockdown necessitated by the Covid-19 pandemic. The research design refers to the case study of six teachers. On five occasions, the teachers were interviewed about the organisation of their virtual classrooms, forms of assessment, and utilisation of (digital) teaching resources from the beginning of March until the end of June 2020. The study results showed that social parameters were prominent factors in the decision-making of many teachers regarding teaching remotely. For example, the teachers always put students' needs first: they were accessible almost all day to their students, they tried not to overload students and provided daily feedback on their work. In addition, the teachers in the study raised the issue of academic dishonesty in remote education – the digital environment made cheating easier and meant that the usual assessment formats became unfeasible. Although the findings provide insight into the work of teachers during a pandemic, a larger sample would provide generalisations about the changes in workload that mathematics teachers experienced during remote education.

Keywords: mathematics teacher, remote education, teaching, virtual classroom

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Hrvaški učitelji matematike in izobraževanje na daljavo v času covida-19: česa so se naučili?

Ljerka Jukić Matić

Namen raziskave je pokazati, kako so se hrvaški učitelji matematike v višjih razredih osnovne šole spoprijeli z izobraževanjem na daljavo med zaprtjem, ki ga je zahtevala pandemija covida-19. Raziskovalni načrt obsega študijo primera šestih učiteljev. Ti so bili od začetka marca do konca junija 2020 petkrat intervjuvani o organizaciji svojih virtualnih učilnic, oblikah ocenjevanja in o uporabi (digitalnih) učnih virov. Rezultati raziskave so pokazali, da so bili socialni parametri pomembni dejavniki pri odločanju številnih učiteljev glede poučevanja na daljavo. Učitelji so, na primer, potrebe učencev vedno postavljali na prvo mesto: učencem so bili na voljo skoraj ves dan, niso jih poskušali preobremeniti in so jim vsak dan posredovali povratne informacije o njihovem delu. Poleg tega so učitelji v študiji izpostavili vprašanje akademske nepoštenosti pri poučevanju na daljavo – digitalno okolje je olajšalo goljufanje in pomenilo, da so običajne oblike ocenjevanja postale neizvedljive. Čeprav ugotovitve omogočajo vpogled v delo učiteljev med pandemijo, bi večji vzorec omogočil posplošitve o spremembah delovne obremenitve, ki so jih učitelji matematike doživljali med izobraževanjem na daljavo.

Ključne besede: učitelj matematike, izobraževanje na daljavo, poučevanje, virtualna učilnica

Introduction

At the beginning of March 2020, the Croatian government closed schools due to the Covid-19 pandemic and introduced remote education as the mode of schooling. In adherence to this, the Ministry of Education and Science (hereafter MZO) directed schools to organise virtual classrooms (MZO, March 2020). Curricular reform has recently been implemented in the Croatian education system, and one of the aims was to bring schools up to date with new technologies (Divjak & Pažur Aničić, 2019). In this process, schools received a significant number of tablets that they could then lend to students for remote learning. Students without internet access were given SIM cards to access virtual classrooms. Television broadcasts, which covered the national curriculum, were created in collaboration with the MZO and volunteer teachers. Primary and secondary students could watch these broadcasts and then communicate with their teachers in virtual classrooms about what they had seen. If teachers could create their lessons and deliver the content and activities in the virtual classrooms, their students would not have to watch the TV broadcasts. The MZO also provided directions on how to make online video lessons using the simplest applications.

Furthermore, the MZO (April 2020) published a document with a set of assessment recommendations. The main focus was on formative assessment, more so than prior to remote education. The key recommendation was to encourage and stimulate students' learning. Nevertheless, the students had to be awarded grades because upper secondary and lower secondary schools finished the school year in June 2020 through remote education. This means that teachers had to organise and conduct some form of summative assessment of students' knowledge.

Although there were many guidelines for remote education, teachers had to deal with many issues on their own, such as organising classroom practice, what resources for teaching and learning they should use, and how to conduct assessments. Similar problems were reported in other European countries such as France, Italy, Germany (Aldon et al., 2021) and on other continents such as Australia (Kalogeropoulos et al., 2021). This paper examines how Croatian lower-secondary mathematics teachers coped with those issues.

Theoretical Framework

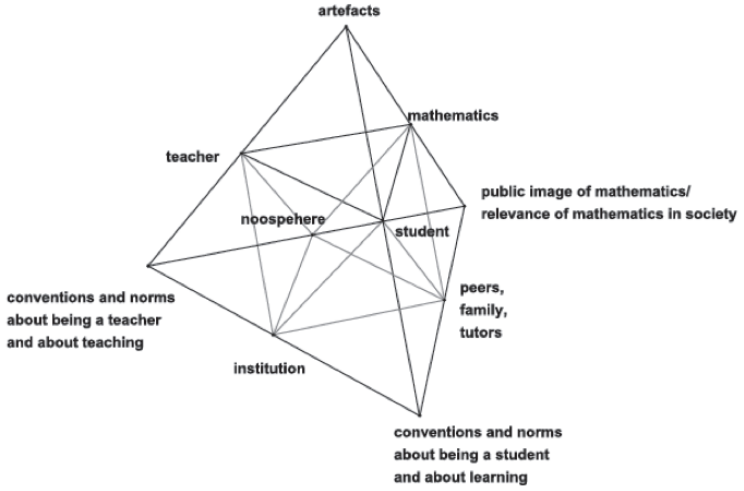
The socio-didactic tetrahedron (SDT) model will be used to examine mathematics classroom practice during remote education as such a model is powerful enough to capture and describe the complexity of educational phenomena in virtual classrooms. Starting from a Vygotskian perspective, Rezat and

Sträßer (2012) re-conceptualised the original didactic triangle (teacher, student, content) by recognising that the connections represented by the sides of the triangle require mediation. Adopting a sociocultural approach, moreover an activity theory (Engeström, 1998), they created a didactic tetrahedron, adding the fourth vertex as the mediating artefact (i.e., the outcome of human activity), made with the precise aim of accomplishing a particular task (Wartofsky, 1979). The artefacts have the role of psychological tools (Vygotsky, 1997), because their central goal is to change student mathematical cognition. Nevertheless, Rezat and Sträßer (2012) prefer the broader notion of artefacts to avoid identifying the notion of a tool with an idea of something material. The mediating artefacts include various resources, from textbooks and digital tools to mathematical tasks and language, because they have the power to shape human activities. In mathematics education, mathematics teaching resources are all the resources developed and used by teachers or students in their interaction with mathematics in and for teaching and learning, inside and outside the classroom (Pepin et al., 2013).

The didactic tetrahedron was further extended by adding social and institutional components at the bottom of it (Rezat & Sträßer, 2012). The bottom vertices of the SDT model are conventions and norms about being a student and about learning, conventions, and norms about being a teacher and about teaching, and the public image of mathematics (Figure 1). Given that these social components are in complex relationships, there are other salient vertices on the bottom edges, such as the institution, the noosphere (the community of teachers and mathematics educators), and peers and family.

Figure 1

SDT according to Rezat and Sträßer (2012)



Each triangular face of the SDT, except the original didactic triangle, can be regarded as an individual activity system in which artefacts serve as mediational means (Rezat & Sträßer, 2012). The teacher's role can be seen as an organiser of students' mathematical activity and is depicted by the triangle *Teacher–Artefacts– Student*. The triangle *Student–Artefacts–Mathematics* represents the student's activity of learning mathematics mediated through resources; the triangle *Teacher–Artefacts–Mathematics* describes the teacher's use of the teaching resources, mediating activity of teaching mathematics, and planning mathematics instruction. Furthermore, the resources lie in a complex and dynamic interplay with the social and didactic parameters that influence the way teachers and students use those resources in the mathematics teaching-learning process.

To investigate how Croatian teachers coped with the demands of remote education, the following research questions were formed: (RQ1) How did lower-secondary mathematics teachers organise classroom practice in remote education and why? (RQ2) How did teachers conduct assessment in virtual classrooms and why? (RQ3) What mathematics teaching resources did teachers utilise during remote education and why?

Method

The design of the study reported in this paper is a case study; purposeful sampling was used. The sample comprised six female lower-secondary mathematics teachers (grades 5 to 8), who were reached through personal connections with the author. Some of the teachers were mentors for preservice mathematics teachers; some had participated in a professional development research project with the author. Acquaintance with the author created a friendly atmosphere in which the participants could engage in open conversations concerning their successes or failures in remote education. Throughout the paper, the teachers will be denoted as Teacher 1, Teacher 2, Teacher 3, Teacher 4, Teacher 5 and Teacher 6.

Yin (2009) claims that the case study method works best when a *how* and *why* question is asked about a set of events over which the investigator has little or no control. A case study research study allows the exploration and understanding of complex issues and proves helpful when an in-depth investigation is required. To answer RQ1, RQ2 and RQ3, I posed questions that asked *how* (Table 1). The organisation of classroom practice and assessment during emergency remote education is portrayed by examining interactions within the triangle *Teacher–Artefacts– Student* (i.e., the teacher as the organiser and

mediator of the resources). The utilisation of mathematics teaching resources also relates to the teacher's mediated activity of doing mathematics and planning mathematics instruction (Rezat & Sträßer, 2012) and is situated within the triangle *Teacher–Artefacts–Mathematics*. In addition, I asked teachers *why* questions to understand the reasons for their choices and decisions better. I aimed to uncover the social and institutional parameters which lie in the background.

Remote education began in the second week of March and lasted until the end of June 2020. The data was collected using online interviews. When direct interaction between researcher and participant occurs through computer-mediated communications (CMCs), Salmons (2015) labels these types of interviews as online interviews and asserts that using videoconferencing allows for an online interview to resemble natural face-to-face communication closely. Online interviews also allow in-depth research. The interviews were conducted on five occasions: the first interview took place in March, the second interview in April, the third interview in May, the fourth interview at the beginning of June and the fifth interview at the end of June (the end of the school year). The same questions were asked in every interview (Table 1). The intention behind this cyclic interviewing was to identify teachers' problems concerning remote education, the development of teaching models and the reasons for using a particular (digital) resource. The interviews were semi-structured, which means that I gave the participants the opportunity to add something if something new happened or if they wanted to share something with me.

Table 1

Questions used in online interviews

Research question	Outline of questions
RQ 1	How do you organise mathematics lessons in the virtual classroom? How do students participate in such lessons? How do you monitor students' logins in virtual classrooms? How do you check students' assignments? Do students ask questions when they do not understand given assignments and how often? Why do you organise classroom practice the way you described? Are you satisfied or dissatisfied with your teaching practice in the virtual classroom? Please explain why. Are you satisfied with students' participation and cooperation? Explain your reasons.
RQ 2	How and how often do you conduct assessments (formative and summative)? Have you encountered any problems related to assessment? Please give details. Why do you assess students in the way you described?
RQ 3	Do you create your own teaching materials, and how? Do you use digital or printed textbooks, and how? Do you use the digital platforms created by the textbook publishers, exchange materials with colleagues, or create video lectures? Explain. How much time do you spend in preparation for remote teaching? Why do you create/do not create your own teaching materials?

After the interviews, the participants emailed the assignments and worksheets they had designed for their students and provided links to video lectures they had created and the forms of digital assessments they used. Teachers also sent examples of students' work. Additionally, they sent screenshots of their virtual classrooms to capture students' activity and communication. Teachers 1 and 2 gave me direct access to their virtual classrooms to experience it myself.

The online interviews were transcribed and analysed. First, all interviews from a single teacher were compared to identify patterns and themes in her teaching practice during remote education. Then I compared the interviews of all the teachers from the same cycle. I looked for similarities and differences among participants. This enabled the identification of common progress for all the teachers. Lastly, other collected data like students' assignments, digital worksheets, or video lectures were examined to justify or discard conclusions.

Results

The study results show that the teachers served as mediators of mathematics teaching resources and organisers of virtual classroom practice during emergency remote education. They gradually changed resource-mediated interaction with students, from using static resources through utilising dynamic digital resources to virtual meetings in some cases. Similarly, the approach to assessment was modified over time. These developments resulted from seeking the optimal model of classroom practice and assessing how a particular change impacted student achievement. Moreover, the teachers' increased familiarity with digital tools and a better understanding of their affordances and constraints also played a significant role in this process. Most of the time, the teachers were guided by what was most beneficial to the students, but they also encountered obstacles that they could not overcome, such as student inactivity or cheating. In the following subsections, I present detailed results for RQ1, RQ2, and RQ3.

Organisation of classroom practice

Mathematics classroom practice in remote education changed over the months regarding the teachers' organisation, mediation of activities, and interaction with students. These changes are recorded in Table 2. The details follow.

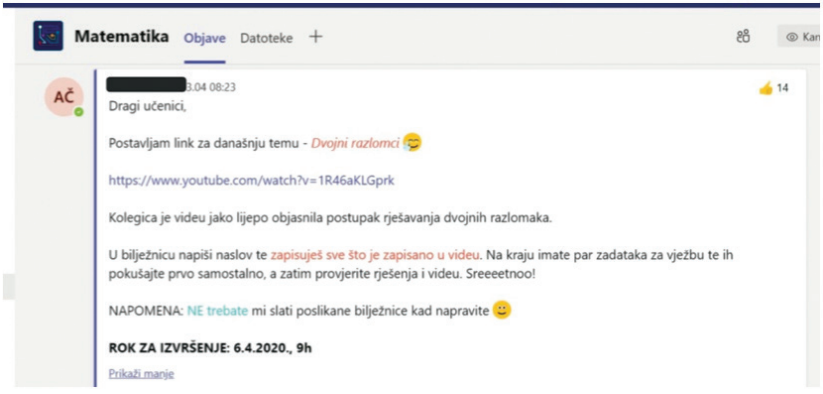
In the first month of remote education, lessons in the virtual classroom consisted of posting assignments for the current math topic. Once a week, the teachers wrote what students had to read or watch and what tasks they had to complete. Interaction with students was established only through homework;

the students sent the completed assignments during the week, and the teachers reviewed them and sent feedback to the students. The teachers explained that many students sent their work irregularly and did not even log in to the virtual classrooms for several days. In some cases, the teachers called and informed students' parents. Teacher 4 attempted real-time communication, but she decided that it was not sustainable for two reasons: first, the system that provided support for the particular social platform was overly busy in the first weeks, so it was not possible to log in to the classroom; second, many students were frequently absent from the virtual classroom.

When remote education continued in the following months, the teachers posted teaching materials in virtual classrooms on the day when mathematics appeared in students' schedules. Assignments had to be completed and handed in by the next mathematics class (for example, see Figure 2). Teachers asked students to 'like' the post as evidence of their presence in the classroom.

> Teacher 2 (April 2020): They have to 'like' my post at some time during the day. Then it means they were in the class that day.

Figure 2
Example of teaching in the virtual classroom as posting materials

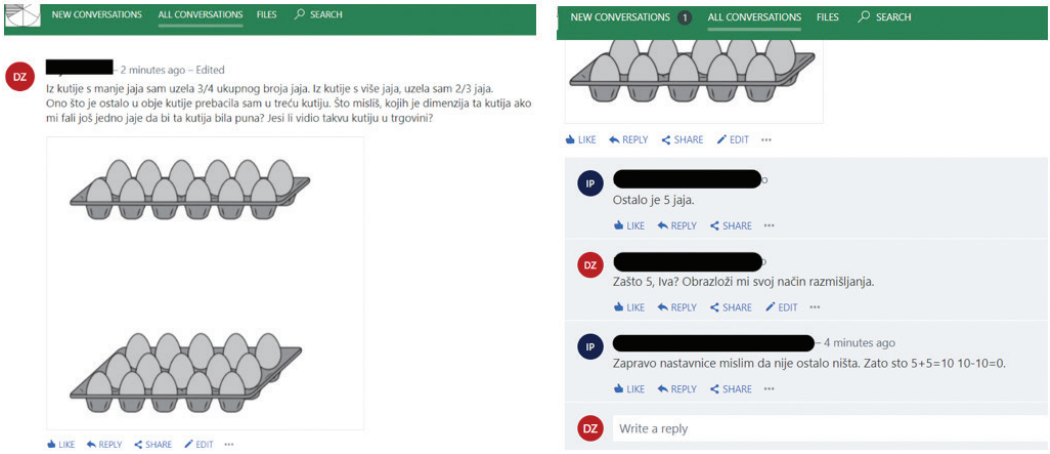


[Translation: I'm posting a link for today's topic - complex fractions. The video explains how to solve these fractions very nicely. Write the title in your notebook and copy everything written in the video. I've given you some exercises; try solving them by yourself, and then check the answers. Good luck. Note: You do NOT have to send photographs of your work. Deadline: April 6th, 2020, 9h]

Teacher 4 decided to rely on TV school for one grade. She taught four different grades (five to eight) and reported that it was too much work to prepare materials for four different lessons for the virtual classrooms. Instead, she adapted her monthly plans to the content in the TV school programmes. This teacher also encouraged students to solve problems by chatting with them in the virtual classroom throughout the day (see example Figure 3).

Figure 3

Example of Teacher 4 encouraging students to solve problems (Grade 5)



a. b.

Translation [a. Teacher: From the box with fewer eggs, I took 3/4 of the total number of eggs. From the box with more eggs, I took 2/3 of the eggs. I transferred what was left to a third box. How big do you think that box is if I need one more egg to make it full? Have you seen a box like that in a store? b. Student: There are 5 eggs left. Teacher: Why 5? Explain your reasoning. Student: In fact, teacher, I think there are none left. Because 5+5=10, and 10-10=0.]

During April and May 2020, most students were active. They sent messages to teachers about mathematical tasks when something was not clear to them. The teachers responded privately to students' inboxes in the virtual classroom or sent messages on Viber. Teacher 1 and Teacher 4 said their students asked only about ICT technology, not mathematics. However, the teachers were available to their students almost all day, and they did not mind when the students sent messages asking something. The teachers concluded that the inability to socialise and go outside activated students around schoolwork, but those who were usually less engaged at school, were also not engaged during this period.

In the last month of remote education, three teachers decided to use real-time communication with students to support learning. However, this was not obligatory, and it was intended only for those who wanted to participate.

> Teacher 4 (beginning of June 2020): I decided to use live meetings for those who wanted to attend.
> Teacher 2 (End of June 2020): I held tutorials once a week for those who wanted to study.
> Teacher 6 (End of June 2020): You know what I did? I painted one wall black for a blackboard, and then I went through what they [the students] didn't understand.

Other teachers explained that they were not set up for this kind of teaching; some did not have the equipment they needed or did not have a suitable working space. However, the teachers noticed that student activity decreased almost to the level it was at the beginning of remote education.

Table 2

Organisation of mathematics classroom practice in remote education

Timeline	March 2020	April & May 2020	June 2020
Teachers	Posting materials in the virtual classroom once a week (all teachers) No deadline for submitting assignments (all teachers)	Posting materials in the virtual classroom according to the school schedule (all teachers) TV broadcasts and problem-solving in a virtual classroom in real-time (Teacher 4) Deadlines for assignments (all teachers)	Posting materials in the virtual classroom according to the school schedule (all teachers) TV broadcasts (Teacher 4) Using virtual meetings as a supplement (Teachers 2, 4, 6) Deadlines for assignments (all teachers)
Students	Students rarely logged into virtual classrooms Mostly passive	Liking the post as evidence of attendance obligatory Students frequently asked questions when they didn't understand Active	Obligatory liking the post as evidence of presence Students asked questions in live meetings when they didn't understand Mostly passive

The teachers generally agreed that remote education in the form of posting materials is not comparable to teaching in a face-to-face classroom situation. Even real-time communication was far from usual classroom interaction, because students would turn their cameras and microphones off. The teachers expressed concern about the depth of the mathematics knowledge students' obtained in circumstances without proper interaction and where their role as the teacher was quite diminished.

> Teacher 3 (April 2020): I am afraid what they [students] will remember next year. They need discussion, challenging their thinking… All things we do in teaching. I am not sure if this [posting materials] qualifies as teaching.
> Teacher 5 (May 2020): I basically post materials. And it is not teaching to me. I had one student, low achieving, telling me 'My mother and I spent the whole afternoon solving your worksheet.' And what's my role here?
> Teacher 1 (End of June 2020): Teaching? Hm... At best, I would call this lecturing. But what about discovery, problem-solving? All those active methods we promote?

Teachers were aware that this type of schooling requires a significant amount of self-study and that their students are not adequately prepared for this. For example, Teacher 5 said that it relates not only to mathematics, 'And it should be borne in mind that students must work for all school subjects in this way'. Other teachers explained they did not want to put more pressure on parents; they were aware that parents had to help students to do the mathematics assignments.

> Teacher 2 (May 2020): These fifth graders… they are still small and dependent on me or their parents. But I was surprised how non-independent seventh graders are!
> Teacher 3 (April 2020): One father called me to complain that he didn't understand what to do. And I said it (the assignment) is for your child, not for you.
> Teacher 4 (Beginning of June 2020): They (the students) were not independent before, and they remained non-independent.

Assessment in remote education

The forms of formative and summative assessment changed during remote education, as can be seen in Table 3. The details are presented below.

In the first months, students sent photos of their work to the teachers, i.e., completed assignments, especially after new content had been introduced, and the teachers gave feedback by writing on the photos or in separate documents. This process continued till the end of remote teaching but to a lesser extent. Providing feedback in this way turned out to be time-consuming.

> Teacher 2 (April 2020): They (students) send me photos of their work on Viber, and then I spend the whole day looking at them, and I write comments on the photos.

> Teacher 4 (April 2020): This feedback…it's time-consuming. They send me photos of their work. And then I sit at my computer the whole afternoon, till midnight, I think…
> Teacher 1 decided not to go over students' work in detail when the remote education entered the second month. She relied on applications with instant feedback. Dispensing with photos increased the amount of free time she had.
> Teacher 1 (April 2020): I dropped the checking of photos [of students' work]. It's an enormous amount of work. I give them [students] a worksheet created in Wiser. They have instant feedback. And using QR codes, they can check their mistakes.
> Teacher 1 (Beginning of June 2020): Yes, I still use Wiser. It functions pretty well. No one complains. Neither students nor parents. And I have time for myself and my family.

Other teachers also used interactive worksheets; the worksheets gave the teachers and students instant feedback, but the teachers saw this kind of feedback as incomplete. The teachers still asked students to send pictures of solutions to the exercises in the static worksheets to monitor students' progress properly.

Some students used available digital technology for academic cheating and plagiarism. The teachers were aware of that problem; they saw cheating in the assignments that students submitted. Some students would also inadvertently copy mistakes. Sometimes the schoolwork was done by parents or siblings.

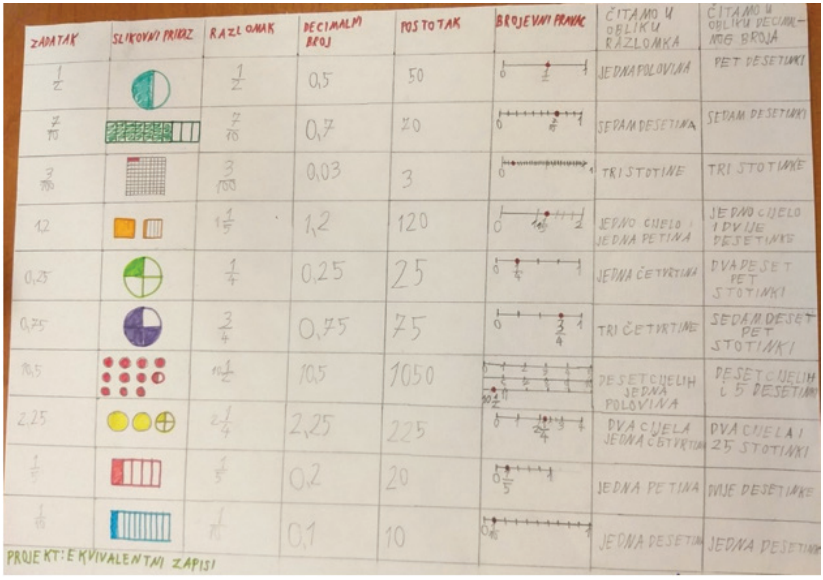
> Teacher 5 (April 2020): I saw different handwriting on the photo. And I asked this student who helped him. His father, he said.
> Teacher 3 created a test using a digital tool which limits the test-taking time. She divided the grade into two groups, where the first group took the test an hour earlier than the second group. Most students in the second group finished in two minutes. However, the teacher found out that someone had logged in under a false name in the first group, taken pictures of the tasks and shared them with students in the second group. Other teachers experienced similar situations; therefore, to avoid attempts of plagiarism and cheating, they decided not to conduct written tests or oral assessments via videoconferencing. Instead, the students received assignments that enabled different solutions for each student (see Figure 4).

Teacher 4 (May 2020): Together with my colleagues from history and English, we created an interdisciplinary project for students. It hasn't got great maths in it, but everyone can participate in their own way.

Teacher 6 (May 2020): I decided that students will create mind maps, in some digital tool, for particular topics. And I will distribute topics according to the students' ability.

Figure 4

Example of student's work for the assigned project task Equivalent fractions (grade 5)



Teacher 1 assigned students a real-life project. The project combined geometry with gardening and required students to investigate prices for particular garden items. The teacher received a complaint from a parent about the unsuitability of the task for that school level.

Teacher 1 (May 2020]: Some of the students created beautiful projects. And you can't get a bad mark here. But I received a complaint from one of the parents. Like, this is not appropriate for grade five, and that she will file a complaint against me.

Table 3
Assessment in remote education

Timeline	March 2020	April 2020	May & June 2020
Formative assessment	Feedback given for photographs of students work (all teachers)	Feedback given for photographs of students work (Teachers 2-6) Using digital tools rarely (Teacher 2-6) Using digital tools only (Teacher1)	Feedback given for photographs of students work (Teachers 2-6) Using digital tools regularly (all teachers)
Summative assessment	No tests (all teachers)	Tests in digital environment (all teachers)	Mathematics project tasks (all teachers) Interdisciplinary projects (Teacher 4)

Utilisation of mathematics teaching resources

The teachers' interaction with teaching resources changed significantly throughout remote education (Table 4). In the beginning, the teachers used available resources like video lectures or presentations from colleagues. The textbook was used for practising and homework, and students sent pictures of their solutions to the teachers. As time went on, the teachers learnt how to use various digital tools to create interactive worksheets and adapt the features to mathematics, but they still prepared static documents with exercises. The teachers were informed about various existing digital tools by talking with other colleagues and tried them out as much as possible. However, they used other teachers' video lectures, presentations, or even TV broadcasts for teaching new content.

> Teacher 3 (May 2020): There are publisher's platforms… they [textbook publishers] are constantly informing us. Then new applications... You could sit for 24 hours a day and investigate what is out there.
> Teacher 4 (May 2020): I looked at lots and lots of things. Lots of applications. Now I'm overwhelmed; I have to choose one tool/application/platform and stick to it.
> Teacher 5 (May 2020): We used Socrative a while ago. And I like WordWall. I discovered you can actually write fractions in WordWall, but you have to use Latex. So I had to re-learn Latex (laughs). Last time I used it, I was a student myself (laughs).

The last month of remote education showed that teachers created their own video lectures or presentations to students in real time. They experimented

with and learnt to use a range of digital tools for teaching mathematics content or to create an environment for practising, but they decided to use as few tools as possible. This decision was based on what was in the best interest of the students; they did not want to confuse or overburden students with a variety of digital tools. For geometry topics, teachers decided to use GeoGebra because it was already used in the school and, therefore, familiar to students.

> Teacher 4 (Beginning of June): I decided to use only Office Forms. It's easy for me to create exercises. You can write mathematical symbols easily. And I don't want to overburden students with various new applications. As it is, I have trouble making them work in a virtual classroom.
> Teacher 5 (End of June): At the school level we decided, um, to keep them (applications) to a minimum. There are too many of them, and students get confused if every school subject uses a different application.

Through the interaction with digital tools, teachers discovered that not all of them are mathematics friendly. Namely, specific mathematical symbols cannot be inserted except for subscript or superscript.

Table 4
Teaching resources used in remote education

Timeline	March 2020	April & May 2020	June 2020
Teaching	Someone else's teaching material - video lecture or presentation (all teachers)	Someone else's teaching material - video lecture, presentation, TV school (all teachers)	Own teaching material (all teachers)
Practising/ Homework	Textbook (all teachers)	Own interactive (all teachers) and static worksheets (Teachers 2-6)	Own interactive (all teachers) and static worksheets (Teachers 2-6)

In the interviews, the teachers said they worked more than 12 hours a day at the beginning of the remote education, which included sourcing materials, adapting materials, answering students' questions using a communication application, and checking students' work. The amount of time needed to create teaching materials decreased towards the end, but they still spent more time working than on a regular school day.

Discussion and Conclusion

The study reported in this paper aims to show how lower-secondary mathematics teachers organised classroom practice, conducted assessments in virtual classrooms and used teaching resources during the emergency remote education.

Organisation of classroom practice, assessment, and utilisation of resources

In the virtual classrooms examined in this study, teaching was impersonal most of the time. Mathematics was meditated to students mainly through mathematics teaching resources and in indirect interaction with the teacher. Students were not actively engaged when teachers mediated mathematics content, but sometime later. It seems that teachers felt that there was a discrepancy in their role as teachers before and during the pandemic; they saw themselves as just being providers of mathematical activities in the virtual classroom, which three teachers tried to overcome by providing real-time teaching in the last month of remote education. Teaching which lacks direct face-to-face communication between students and teachers can hinder teachers' ability to assess students' understanding and reasoning in a meaningful way. For mathematics teaching to be effective, teachers need to listen to and interpret students' actions (talk, gestures, and writing) and thinking while students make decisions (Jacobs et al., 2010; NTCM, 2014). This means that it is important to know students' reasoning, difficulties, mistakes, and misconceptions (Swan, 2001). The lack of face-to-face communication might not be a problem for a well-designed online course, but it turned out to be a problem in ad hoc virtual classrooms where the teacher tried to replicate a regular classroom.

Assessment in virtual classrooms focused on formative assessment, providing continuous feedback to students on their comprehension and understanding of mathematical content during remote education. Teachers in the study based summative assessment on small projects, which enabled the authenticity of students' work. The lack of personal interaction between students and teachers in the teaching process influenced student activity. Such learning of mathematics required students to be more independent in virtual classrooms than in regular classrooms. Also, the assessment teachers designed emphasised students' responsibility for the process and product of self-learning. Although we do not have enough data to make a strong inference about the quality and depth of students' learning, the teachers' statements indicate that many students had a hard time with the self-learning of new mathematical content. In a study

of teachers' perceptions of students dealing with emergency remote education, Jelińska and Paradowski (2021) reported that older students (higher secondary and tertiary levels) could better adapt and take control of their learning because they have better-developed self-learning strategies, unlike younger students.

It is important to point out that effective mathematics teaching reflects the quality of students' learning, especially knowledge retention and transfer (NCTM, 2014). Even with teachers' best intentions to design a quality teaching environment, it remains to be seen whether classroom practice in emergency remote education was effective in the long run, because creating productive instructional episodes by mobilising various resources remains problematic in regular classroom practice (Jukić Matić, 2019). Of all the resources used by teachers over this period, such as video lessons, voice-over presentations, digital and non-digital worksheets, the textbook was used the least. While mathematics textbooks are the most used teaching resource in mathematics education worldwide (e.g., Fan, 2013), as is also the case in Croatia (Glasnović Gracin & Jukić Matić, 2016), it seems that their role diminished in online lessons. The study results showed that other kinds of resources became more prominent but that creating these resources for virtual classrooms took more time than for regular lessons.

Influence of social and institutional parameters

The study's findings showed the significant influence of the bottom of the SDT, social and institutional parameters, on mathematics remote education during the COVID-19 pandemic. The conventions and norms about being a teacher and about teaching had an essential role in shaping teaching in the virtual classroom. Moreover, these norms impacted many teacher decisions. Teachers' awareness that some digital tools are incompatible with mathematics (e.g., the inability to write certain mathematical symbols) made them look further for tools/applications that could overcome these difficulties. That placed the teachers in the role of learners. The norm about being a teacher implies continuous learning (Timperley et al., 2007).

Nevertheless, having to take on this role increased the amount of time needed to fulfil their work obligations. Further, the communication between the teachers and their students happened almost daily, designed to give individual feedback. These teachers spent a great deal of time checking photos of students' work, even though providing such feedback is time-consuming. It seems that giving feedback was also important to teachers in other countries during emergency remote education (Aldon et al., 2021; Kalogeropoulos et al., 2021). To avoid cheating and to evaluate students' knowledge fairly, the teachers in

the study designed assessment tasks that differed from student to student. This kind of assessment is also time-consuming.

Furthermore, the fact that the teachers made themselves available to respond to students' questions reflects the norm of being a teacher (McClain & Cobb, 2001). All the above emphasises a teacher's role as a facilitator who proactively supports students and their learning during remote education. Studies examining teachers' workloads during the pandemic have shown that remote education has increased a teacher's sense of responsibility for student achievement and their job-related stress levels (e.g., Collie, 2021; Jelińska & Paradowski, 2021).

Some students did not perceive this mode of education as compulsory, carrying with it certain obligations and responsibilities, because in the first and last month, many were not active in the virtual classrooms. The students' obligations and rights, namely social norms, are usually established at the beginning of the school year and, as such, form classroom culture (Wood, 1994). The norms about being a student in a mathematics classroom had been established and renegotiated during remote education, but it seems that the impersonal nature of interaction with teachers meant that the new norms were difficult to uphold. Some students engaged in academic dishonesty (e.g., cheating in tests, copying homework or plagiarism), and it seemed that academic integrity was more difficult to maintain in an online setting. Academic dishonesty is not a foreign concept for Croatian students. At the primary school level, recent research conducted by Ristić Dedić et al. (2017) showed that more than 30% of eighth-grade students said that they copied other students' homework, while almost 50% stated that they rarely do so. However, this would indicate that academic dishonesty is fairly widespread among the surveyed primary school students as even the response 'rarely' suggests instances of copying.

The noosphere served as the support to the mathematics teachers, until they became skilled with various digital tools. Teachers shared materials with their colleagues more than they did before the pandemic, and they kept one another informed about new digital tools and their possibilities. Making use of others' materials and suggestions alleviated teachers' workloads. Various research has stressed the importance of collegial relationships for teacher professional growth and development (e.g., Retallick & Butt, 2004). Moreover, collegiality helps teachers cope with uncertainty and complexity and respond effectively to changes (Hargreaves, 2000), which was certainly in evidence during the period of remote education.

The Ministry of Education instructed schools to organise remote education so as to resemble regular school life as much as possible. The schools

were left to determine the features of the virtual classroom they would use; as a consequence, putting some teachers in ICT environments that were not mathematics-friendly. This highlights the role of institutions in the SDT model. The parents also had a significant role in emergency remote education. Teachers in the study estimated that their students, aged 11-14 years, were not sufficiently independent to meet school and mathematics obligations alone and that the input of many in the teaching-learning process was significant. Although educational literature promotes the partnership between parents and teachers for students' mathematics success (e.g., Jay et al., 2018; Patall et al., 2008), this partnership is of a different nature than in distance education during a regular classroom in a pandemic. It could be argued that some parents had more to do with schoolwork in virtual classrooms because they had to become substitute mathematics teachers at home.

Limitations and further directions

One limitation of this study is examining remote education only from the teachers' perspective and neglecting the students' perspective. However, given the conditions at the time, including lockdown and social distancing, this was not an option. A second limitation is connected with the number of teachers. A greater sample would provide generalisations about the changes in workload that mathematics teachers experienced in remote education. This study also revealed some hidden assumptions of remote education, which emerged as secondary results. The first assumption was that teachers had access to good ICT equipment and a good internet connection. If a teacher relied on the TV school and reduced their activity in virtual classrooms to a minimum, then they had real-time online meetings in virtual teacher lounges with school principals. The second assumption was that teachers had adequate space at home to prepare and conduct remote teaching, for instance, creating video lectures or recording their voice on presentations. The third assumption was that teachers who taught in virtual classrooms were relatively ICT literate and possessed a sound knowledge of online pedagogy in order to create successful virtual learning environments. However, is it reasonable to expect all of these things from Croatian teachers, or indeed any teachers? Given the variety of digital tools that teachers learnt to use, future research could address and assess teachers' pedagogical design capacity, meaning ability to perceive and mobilise mathematics teaching (digital) resources to create productive instruction episodes (Brown, 2009).

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The Opinion of Slovene (Mother Tongue) Teachers on Distance Learning in Primary Schools

Tomaž Petek[1]

The Slovene language has several roles in the educational process in the Republic of Slovenia, including its role as a subject in the curriculum in its own right. It is a basic general education subject in public primary schools and has the most hours of all of the subjects. All teachers were forced to teach remotely for the first time in the history of education (first during the 2019/20 school year and then in the 2020/21 school year) during the Covid-19 coronavirus pandemic. The results of a survey comprising 348 teachers with the ability to teach the mother tongue at primary school level (grades 1–9 of primary school; 59% were class curriculum teachers and 41% were Slovene language teachers) show, among other things, that teachers mostly have a good attitude towards distance teaching and feel empowered for this type of teaching, although they feel that this method makes them mentally and physically more tired than teaching in the classroom. Among the advantages of distance teaching, teachers mention the greater use of modern information and communication technology, more use of e-material and the opportunity for formal monitoring of students. In their opinion, the biggest problems of distance teaching (of the Slovene language) include: lack of student participation; lack of non-verbal communication, thus creating difficulties in understanding; and technical issues. Most teachers believe that students acquire less knowledge or far less knowledge by distance education than they would from education in the classroom. Teachers who feel more empowered to teach remotely also have a better attitude towards teaching their mother tongue and are more satisfied with the communication aspect with students in distant teaching. Teachers who have received the necessary training for distance teaching as part of their work feel more empowered to teach this way than teachers who have not had such training.

Keywords: Slovene language, distance teaching, empowerment, advantages, disadvantages

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Mnenje učiteljev slovenščine (materinščine) o poučevanju na daljavo v osnovni šoli

Tomaž Petek

Slovenščina ima v vzgojno-izobraževalnem procesu v Republiki Sloveniji več vlog, med drugim tudi vlogo učnega predmeta, ki je temeljni splošnoizobraževalni predmet v javni osnovni šoli in ima izmed vseh predmetov največ ur. Vsi učitelji so bili prvič v zgodovini šolstva (najprej v šolskem letu 2019/20, nato pa še v šolskem letu 2020/21) med epidemijo koronavirusa covid-19 prisiljeni poučevati na daljavo. Izsledki raziskave, v kateri je sodelovalo 348 učiteljev, ki imajo v osnovni šoli kompetence za poučevanje materinščine (59 % učiteljev razrednega pouka in 41 % učiteljev slovenščine), med drugim kažejo, da imajo učitelji, čeprav čutijo, da jih delo na daljavo psihično in fizično bolj utrudi kot delo v razredu, po večini dober odnos do poučevanja na daljavo in da se počutijo opolnomočene za tovrstno poučevanje. Med prednostmi poučevanja na daljavo učitelji omenjajo večjo uporabo sodobne informacijsko-komunikacijske tehnologije, več uporabe e-gradiva in možnost formativnega spremljanja učencev. Med največjimi težavami poučevanja (slovenščine) na daljavo pa omenjajo: primere izmikanja in nesodelovanja učencev, pomanjkanje nebesedne komunikacije in s tem oteženo razumevanje ter tehnične težave. Večina učiteljev meni, da bodo učenci z izobraževanjem na daljavo pridobili manj oz. precej manj znanja, kot bi ga s poučevanjem v razredu. Učitelji, ki se počutijo bolj opolnomočene za poučevanje na daljavo, imajo tudi boljši odnos do poučevanja materinščine na daljavo in so tudi bolj zadovoljni s komunikacijo z učenci na daljavo. Učitelji, ki so imeli v sklopu službe potrebna izobraževanja za poučevanje na daljavo, se počutijo bolj opolnomočene za poučevanje na daljavo kot učitelji, ki takih izobraževanj niso imeli.

Ključne besede: slovenščina, poučevanje na daljavo, opolnomočenost, prednosti, slabosti

Introduction

The Slovene language has different roles in the educational process in the Republic of Slovenia. Besides being the official and state language, it is also the first language for most students (or the second language/language of the environment), while in the curriculum, it also has the role of the language of learning in general subjects.[2] It is a basic general education subject and has the most hours of all subjects in primary school education (1,631.5).[3]

The objectives of the Slovene course are demanding and complex, and their implementation depends on several factors, including the ability of the teacher, the developmental stage of the students, the complexity of the material, and the working conditions. Plut Pregelj (2004) emphasised that the best possible conditions must be created for the student to be active in the learning process and to gain new insights. These conditions are also emphasised by linguists and other researchers in recent studies (e.g., Rot Vrhovec, 2020; Paniagua & Istance, 2018; Vogel, 2015; Valenčič Zuljan & Blanuša Trošelj, 2014). Since distance learning is the so-called new reality, the result of these conditions in the virtual environment has not yet been explored in detail. Barbour (2019) states that the volume of education by distance learning is increasing dramatically, and the literature, especially in respect to research, is not keeping pace. Various authors (Bregar et al., 2020; Maher, 2014; Means et al., 2010) list the advantages and disadvantages of distance education, but there is not a great deal of scientific research on teachers' attitudes towards distance learning or their opinions regarding it. Rupnik Vec et al. (2020) has published an analysis of distance education during the Covid-19 pandemic in Slovenia. At the national level, the research was supported by the National Education Institute of the Republic of Slovenia, the main body in the field of education in the Republic of Slovenia. The findings show that students rated distance learning during the Covid-19 pandemic as more demanding than classroom instruction, but also perceived it as interesting and creative. Students considered the negative aspects to be the lack of social contact with classmates and teachers, while many students also missed teachers providing explanations. Among high school and upper elementary school students, 30% considered that it was easier to learn via distance learning. Teachers also felt that distance work was demanding and stressful, but they managed to achieve most of the established learning goals. They were, however, critical in their self-assessment regarding teaching quality: 60% believed that the quality of their distance learning was slightly worse than live

2 On the roles and position of Slovene in the educational process, see Petek (2013). On Slovene as a subject, see Primary School Programme. Slovene Language. Curriculum (2018) and Rot Vrhovec (2020).

3 Mathematics is in second place in terms of the number of hours (1,318 hours).

teaching and 10% considered that it was significantly worse, as distance teaching required completely different approaches than live teaching.

Krapše et al. (2019) state that "modern principles of learning and teaching are aimed at promoting a proactive role in the learning process, which puts the student and the teacher in a dynamic and collaborative relationship. Within the framework of such learning practice, the teacher creates conditions for a stimulating learning environment in which the student, in addition to knowledge, systematically builds up skills and abilities and forms his/her own model of values in a constructive dialogue between peers and adults. It is important for the management of the learning process how the teacher understands learning, as well as the point that he/she is familiar with the latest knowledge and paradigms about learning", adapted to the individual (Rihter & Potočnik, 2020). We agree with the authors, even when they say that quality education strongly depends on good teachers.

All teachers were forced to teach remotely for the first time in the history of education (first during the 2019/20 school year and then in the 2020/21 school year) during the Covid-19 pandemic. In a very short space of time, all phases of the lessons had to be adapted. Significant changes were needed in the planning of activities, but also in the implementation, testing and assessment of students' knowledge, in providing feedback,[4] etc. The National Education Institute of the Republic of Slovenia, which is the central national research and development and counselling institute in the field of education, prepared guidelines for all teachers as an aid and support in the implementation of distance education.

Teachers dealt with the new situation in different ways. Since Slovene language as a subject in public primary school in the Republic of Slovenia can be taught by class curriculum teachers (in the first and second educational period) and Slovene language teachers (in the second and third educational period),[5] we conducted empirical research among these teachers on teaching Slovene language (mother tongue) remotely. We were interested in their opinions and experiences.

Slovene language (mother tongue) as a subject of the curriculum

The subject Slovene language is divided into two independent parts, i.e.,

4 On the importance of feedback, see also Godec Soršak (2019).

5 According to so-called Bologna study (after completing the second level), the official professional title for a class curriculum teacher is 'master professor of teaching at class level' (with English) (formerly: a class teacher) and a Slovene language teacher is a 'master of Slovene studies' (formerly: professor of Slovene).

language and literature lessons, with 60% of all hours devoted to reading non-fiction texts and 40% to reading fiction texts (with the exception of the first grade, in which the ratio is 50:50)[6] (Primary School Programme. Slovene Language. Curriculum, 2018). Students need to be aware of the differences between the two fields (ibid.), but Saksida (2008) states that this should not lead to the complete independence of either of them.

The purpose of language lessons is to develop communication skills in the Slovene (literary) language, which means practical and creative mastery of all communication activities and the basics of the language system. In literature lessons, students encounter literary texts and, in addition to communicative ability, they also develop experiential, imaginative, creative, evaluative and intellectual abilities (Primary School Programme. Slovene Language. Curriculum, 2018).

The teacher must lead the learning process taking into account the importance of the subject and the amount of material that must be transmitted to students in such a way as to ensure the development of each student, while also taking into account the principles of individualisation and the differentiation of lessons,[7] as well as being an example to all students throughout the learning process. The teacher must encourage students to ask questions, solve problems and undertake research, as well as to plan their own learning and to monitor and evaluate it (adapted from Krapše et al., 2019). In order for a teacher to achieve this, he or she must establish a stimulating learning environment, which represents a unique challenge (involving both burden and fear) for each teacher.

Distance learning of Slovene language during the Covid-19 pandemic

In the 2019/20 school year, due to the closure of all educational institutions, a very unpredictable period began in which schools had to switch to distance

6 Primary general education in the territory of the Republic of Slovenia is organised into 455 primary schools and 319 branch schools (Kustec et al., 2020). More detailed data on the number of hours of Slovene in public primary schools in the Republic of Slovenia show that in the first three-year period, 700 hours per year are devoted to this subject (399 hours for language lessons and 301 hours for literature lessons). In the second three-year period, 525 hours are available (315 hours for language lessons and 210 hours for literature lessons), and in the third three-year period 406.5 hours (86.5 hours for language lessons and 57.5 hours for literature lessons). Slovene is the most frequent of all subjects in the timetable: 6 times per week in the first grade, and 7 times per week in the second and third grades (according to the current curriculum, students should learn reading and writing techniques by the end of the second grade and should revise these by the end of the third grade). From the fourth to the sixth grade, Slovene is on the timetable 5 times per week, i.e., every day; in the seventh grade, 4 hours per week are available; in the eighth grade it accounts for 3.5 hours per week, and in the ninth and final grade, it represents 4.5 hours per week (Primary School Programme. Slovene Language. Curriculum, 2018).

7 For more information about this, see Valenčič Zuljan and Kalin (2020); Tomlinson (2010); Strmčnik (2001).

education in an extremely short period of time.[8] A similar situation emerged in the 2020/21 school year, when schools had to organise distance education again.[9] The results of the latest research, which was conducted during the initial period of remote education (e.g., Rupnik Vec, 2020; ZASS, 2020) show that it is necessary to improve the training of teachers in certain fields, to improve equipment in schools, to make even greater effort, and to address the preparation and implementation of the educational process in order to ensure greater quality, fewer disparities between students, and the provision of equal opportunities for all.

In the circumstances in which school classrooms were replaced by a digital learning environment, as Kavčnik Kolar (2020) notes, Slovene language teachers, too, had to face the challenges of how to keep students in touch with the Slovene language, how to maintain their level of acquired knowledge, how to encourage them to work independently at home, how to maintain the collaborative aspect of lessons,[10] and how to plan Slovene language lessons under the challenging circumstances. The basic tools for this are offered by modern internet technology, which supports the work of teachers and students in the process of the advancement of knowledge (remotely). In order to support teachers in distance teaching, curricula were digitised at the National Education Institute of the Republic of Slovenia. In the first phase, these so-called interactive curricula enable the simultaneous presentation of: learning objectives, content, standards of knowledge for three-year periods, minimum standards of knowledge and didactic recommendations for a specific segment; an individual topic for all three educational periods (grades 1–9); segments that appear in several educational periods; segments for any selected/specified selection of segments; and individual parts with the capability of being copied or filtered by keywords/

8 During the Covid-19 pandemic, four models of teaching were planned for primary education in the Republic of Slovenia. They were prepared by the Ministry of Education, Science and Sport in cooperation with the National Education Institute of the Republic of Slovenia and the National Institute of Public Health, and they represent the foundation for the organisation and implementation of lessons in the future. Model A foresees that all students are educated in school. Model B foresees that all pupils are educated in school in accordance with the recommendations of the National Institute of Public Health (www.nijz.si). Model C foresees that students from the first to the third or fifth grade are educated at school (if space and staff conditions permit), and all other students are educated remotely. Model D foresees that all students are educated at a distance (Kustec et al., 2020). Activation of a particular model for schools is determined at the national level, and the decision is made by the Government of the Republic of Slovenia or the Minister responsible for education (Kustec et al., 2020).

9 The central professional institutions responsible for education in the Republic of Slovenia – the Ministry of Education, Science and Sport and the National Education Institute of the Republic of Slovenia – issued a document in 2020 entitled *Education in the Republic of Slovenia in Conditions Related to Covid-19. Models and Recommendations*, in which they defined: 1) starting points for the preparation of education models; 2) models for teaching implementation; 3) recommendations to schools on how to deal with the Covid-19 disease; and 4) technical and system support for lessons.

10 For more on collaborative learning forms in Slovene, see Rot Vrhovec (2015).

section/objectives (this is especially useful in cross-curricular teaching and vertical integration). In interactive curricula, the objectives of selected segments that should be given priority in distance teaching are specifically highlighted (with an exclamation mark "!"). Gradually, other priority objectives for all segments will be indicated. Green highlighting indicates particular content and objectives that are easier to deal with in distance teaching.[11] As we are interested in the experiences of teachers using distance teaching (Slovene language) and their opinions, we conducted empirical research, the results of which are presented below.

Research questions

In the present research, we were interested in: 1) the attitude of teachers who teach the Slovene language towards distance education; 2) how satisfied they are with their computer abilities; 3) how satisfied they are with the communication aspect of students being taught remotely; 4) whether they have adequate equipment for distance teaching; 5) whether they have the necessary training for distance teaching; 6) what modern technology they use (e.g., ZOOM, Teams, Meet, online classrooms, email, etc.) and how frequently; 7) which field – language or literature – they find more demanding to teach remotely and why; 8) how they choose UN learning content that is suitable for distance education; 9) what types of learning methods and forms they use in distance teaching; 10) in what way they individualise and differentiate the learning material in distance teaching; 11) which types of e-learning materials proved to be the best; 12) how and in what way they give feedback to students; 13) which of the professional bodies they cooperate with if the student does not respond; 14) how they assess knowledge; 15) what assignments are submitted by the students and whether they are linguistically appropriate; 16) whether they observe that students are unmotivated and fail to work if there is no assessment involved; 17) whether the quality of the submitted assignments changes through distance education and whether they feel that students gain as much knowledge as they would in school lessons; 18) how they inform parents about the work of students; 19) whether they feel that distance teaching makes them more mentally and physically tired than teaching in the classroom, and how many hours per day they spend preparing materials, video calls, records and lessons; 20) the advantages and difficulties in teaching Slovene language remotely.[12]

11 Source: Circular of the National Education Institute of the Republic of Slovenia Concerning Support in the Implementation of Distance Teaching (www.zrss.si).

12 We were also interested in a comparison between the two profiles of teachers: class curriculum teachers and Slovene language teachers who have the necessary training to teach their mother tongue in primary school.

Method

Participants

The authorial online survey questionnaire *Distance Teaching of Slovene Language (Mother Tongue) in Primary School from the Point of View of Teachers – Challenges and Dilemmas*[13] was completed by 348 teachers, of which 59% were class curriculum teachers and 41% were Slovene language teachers. The respondents also answered a question about their length of service. Most of the teachers (30%) have 19–30 years of service or 7–18 years of service (30%), followed by teachers with more than 30 years of service (22%). Just 11% of the teachers have 1–3 years of service, and 7% have 4–6 years of service. By statistical region, most of the teachers (24%) teach in the Central Slovenia region, followed by teachers from Southeast Slovenia (12%), Upper Carniola (11%), Drava (9%), the Savinja region (8%), the Mura region (7%), Central Sava, Gorizia, Coastal-Karst (6%), and the Littoral-Inner Carniola region (5%). The fewest teachers are from the Carinthia (4%) and Lower Sava regions (2%).

Research method and data processing and presentation

We employed a descriptive and causal, non-experimental method of pedagogical research, and the IBM SPSS Statistics 25 software tool was used for data analysis. In addition to the basic descriptive statistics, we used non-parametric tests to verify the hypotheses, given that all of the variables except age were nominal or ordinal. The chi-square test of independence was used to verify the correlation of two nominal variables, the Spearman's rank correlation coefficient was used to verify the correlation of two ordinal or one ordinal and one ratio variable, and the Mann-Whitney U-test was used to verify the differences between the two groups of teachers regarding the ordinal variables.

Results and discussion

We first present the results of basic, descriptive statistics that provide answers to the research questions, and then the results of hypotheses testing.

In **Part 1** of the survey questionnaire, we verified the **teachers' attitudes towards distance teaching**. On a 5-point rating scale (very poor, bad, good, very good or excellent), the teachers first expressed their attitude towards teaching Slovene language remotely. Most of them (54%) answered that it was good, 23% said that their attitude was very good, 14% that it was bad, 6% that it was

13 The survey questionnaire was available at https: // www.1ka.si/a/317825, from 22. 12. 2020 to 2. 2. 2021. Its composition is evident when interpreting the results of the research.

excellent, and 2% that it was very bad. According to the same rating scale, most of the teachers (51%) rated themselves as well equipped for distance teaching, 33% answered that they were very well equipped, 10% poorly equipped, 5% very poorly equipped, and 1% extremely poorly equipped. Most of the teachers were satisfied with distance communication (65%), 7% were very satisfied, and 17% were undecided; the rest were either dissatisfied (10%) or very dissatisfied (1%).

In **Part 2,** we were interested in the **organisational and technical aspect** of distance teaching. The employer (school) provided 65% of the teachers with appropriate technical equipment for distance teaching, while 35% of the teachers stated that they did not receive such equipment. A total of 66% of the teachers had the necessary training for distance teaching, while 34% did not have such training. Most of the teachers mentioned the following type of training: MS Teams, ZOOM, Meet, online classroom, One Note and various online tools (Mentimeter & Kahoot). Most of the teachers use ZOOM for distance teaching, followed by MS Teams and Arnes online classrooms, while many also use email. Some 59% of the teachers used modern distance teaching technology for every lesson, 25% for every other lesson, 11% occasionally (every third lesson), and 5% rarely (every fourth lesson). None of the teachers stated that they would never use the tools mentioned above.

In **Part 3,** we were interested in the **didactic aspect of teaching**. As many as 63% of the teachers answered that language lessons were more demanding with distance teaching, while 37% thought that literature lessons were more demanding. When they were asked how they chose content from the curriculum that they considered suitable for distance teaching, most (38%) answered that it was their own decision, 20% followed an interactive curriculum, and the rest combined similar content. The most common forms of teaching are classroom led teaching, individual work and group work, and the least common is pair work. In terms of teaching methods, the best represented are explanation, text work and conversation, while the least represented methods are those involving demonstrations, roleplay and graphic work. The teachers are also aware of the importance of implementing differentiation and individualisation. Most of them (38%) give individual feedback, 29% offer additional individual assistance along with supplementary and additional classes, while 17% assign differentiated tasks. Most of the teachers give feedback orally via video conferencing (81%), followed by written feedback through online classrooms (65%), and finally written feedback by email (50%). So-called i-textbooks (interactive textbooks with interactive elements and constructions) proved to be the best e-learning material (69%), followed by d-textbooks (digitised textbooks, i.e., e-editions of printed textbooks) (30%), while only 1 % of teachers use an e-portfolio. If students do not respond remotely, the teachers receive the most assistance (37%) from the

school counselling service, followed by colleagues who have fewer responsibilities, e.g., teachers in after-school services (22%), while school management rarely gets involved (7%). Regarding the assessment of knowledge, the majority of the teachers (64%) answered that they did not assess students according to the recommendations, followed by teachers who gave verbal assessments (24%). Only 9% of the teachers assessed knowledge in a different way (authentic assignments and speech assignments), and 2% used certain programs, applications and tools. None of the teachers assessed written tests by distance learning.

In **Part 4,** we were interested in the **teachers' observations regarding the work of students and cooperation with parents in distance teaching.** According to the teachers surveyed, the assignments submitted by students were mostly appropriate (55%), while 45% of the teachers stated that they were deficient. A total of 64% of the teachers stated that students tended to follow language rules when writing, while 36% stated that students did not follow language rules when submitting assignments. Some 55% of the teachers noticed that students were not motivated to work if there was no assessment involved, while 45% considered that this was not the case. A total of 45% of the teachers believed that the assignments students undertook and submitted remotely were comparable to the situation as it was when distance education commenced, 36% of them considered that the situation was worse with the extension of distance education and that students were falling behind, while 19% believed that the assignments were better and that the students were making progress. We were also interested in seeing whether the teachers informed parents about the students' work. The majority (70%) answered that they contacted them if necessary and as part of regular parent evening events, 20% said that they notified them once per week, while 7% said that they did not inform parents about the students' work because they trusted them to check online classrooms and to work with the child.

In **Part 5,** we looked at the **teachers' opinions about their own distance teaching**. As many as 86% of them answered that they felt that distance teaching made them mentally and physically more tired than teaching in the classroom. Most of the teachers (38%) stated that they spent nine to ten hours per day teaching remotely, followed by teachers who worked five to eight hours per day (33%), and then by those who worked more than ten hours per day (25%). Among the advantages of teaching remotely, the teachers mentioned the greater use of modern information and communication technology (64%), more use of e-material (22%), and the opportunity for formal student monitoring (14%). Amongst the biggest problems in distance teaching (Slovene language), the teachers mentioned: lack of student participation (31%), lack of non-verbal communication and, consequently, difficulties in understanding (29%), and technical problems (13%).

In the context of the research, we were also interested in a comparison between the two profiles of teachers, class curriculum teachers and Slovene language teachers who have the necessary training to teach their mother tongue in primary school (the former in the first and second three-year period, and the latter in the second and third three-year period).[14] We therefore established several hypotheses and verified them using statistics. The results are presented below.

- H 1: There is a difference between class curriculum teachers and Slovene language teachers in relation to distance teaching of Slovene language.

As Table 1 shows, the average rating of attitudes towards teaching Slovene language remotely was 3.25 for class curriculum teachers and 3.11 for Slovene language teachers. However, the result of the Mann-Whitney test is not statistically significant (U = 13374.0; p = .144), so we cannot claim that there is a difference between class curriculum teachers and Slovene language teachers in relation to distance teaching of Slovene language. Hypothesis 1 cannot be confirmed.

Table 1

Teachers' attitudes towards teaching Slovene language by distance learning

					Mann-Whitney test	
	No.	Average	No. deviation	Median	U	p
Class curriculum teachers	204	3.25	.849	3.00	13374.0	.144
Slovene language teachers	143	3.11	.752	3.00		

- H 2: There is a difference between class curriculum teachers and Slovene language teachers regarding their satisfaction with their own digital abilities.

As Table 2 shows, the average rate of satisfaction with their own digital abilities was 3.36 for class curriculum teachers and 3.29 for Slovene language teachers. However, the result of the Mann-Whitney test is not statistically significant (U = 13932.0; p = .431), so we cannot claim that there is a difference regarding

14 Article 5 of the *Rules on the Level of Education of Teachers and other Professionals in Educational Programmes of Primary Schools*: "A teacher of Slovene from the first to the fifth grade may be one who has completed: a university study programme or a second-cycle master's programme (teaching at grade level) or classroom teaching. A teacher of Slovene in the sixth grade and in the third period can be one who has completed: a university study programme of Slovene or a master's study programme of the second level of Slovene language and literature or Slovene studies."

satisfaction with their own digital abilities between class curriculum teachers and Slovene language teachers. Hypothesis 2 cannot be confirmed.

Table 2

Satisfaction of teachers with their own digital competencies

	No.	Average	No. deviation	Median	Mann-Whitney test	
					U	p
Class curriculum teachers	204	3.36	.765	3.00	13932.0	.431
Slovene language teachers	143	3.29	.637	3.00		

- H 3: There is a difference of opinion between class curriculum teachers and Slovene language teachers as to which area is more demanding for distance teaching.

Table 3 shows that 79.4% of the class curriculum teachers believe that language lessons are more demanding for distance teaching, and 20.6% believe that literature lessons are more demanding. Among the Slovene language teachers, 62.2% believe that language lessons are more demanding for distance teaching, and 37.8% believe that literature lessons are more demanding. The result of the chi-square test is statistically significant ($\chi^2 = 11.547$; $p = .001$), so we can say that there is a difference of opinion between class curriculum teachers and Slovene language teachers regarding which area is more demanding for distance teaching. Hypothesis 3 can be confirmed.

Table 3

Teachers' opinion regarding which area is more demanding for distance teaching

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
Which area do you find more demanding for distance teaching?	language lessons	162	79.4	89	62.2
	literature lessons	42	20.6	54	37.8
Total		204	100.0	143	100.0

Note. * $\chi^2 = 11.547$; $p = .001$.

- H 4: There is a difference between class curriculum teachers and Slovene language teachers in how they assess knowledge.

As Table 4 shows, among the class curriculum teachers, 17.6% assess knowledge verbally, while there are no teachers who assess knowledge in writing. Only 1.0% assess knowledge using certain programs, applications and tools, while 5.9% assess knowledge in a different way, and 75.5% do not assess knowledge according to the recommendations. On the other hand, among the Slovene language teachers, 31.3% assess knowledge verbally and 0.7% assess knowledge in writing. Only 4.2% assess knowledge using certain programs, applications and tools, while 13.9% assess knowledge using a different method, and 50.0% of the teachers do not assess knowledge according to the recommendations. The result of the chi-square test is statistically significant ($\chi^2 = 26.186$; $p < .001$), so we can say that there is a difference between class curriculum teachers and Slovene language teachers in how they assess knowledge. Hypothesis 4 can be confirmed.

Table 4
Types of knowledge assessment

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
How do you assess knowledge?	verbally	36	17.6	45	31.3
	in writing	0	.0	1	.7
	using certain programs, applications, tools	2	1.0	6	4.2
	in a different way (authentic assignments, speaking assignments)	12	5.9	20	13.9
	I do not assess knowledge according to the recommendations	154	75.5	72	50
Total		204	100.0	144	100.0

Note. * $\chi^2 = 26.186$; $p < .001$

- H 5: There is a difference of opinion between class curriculum teachers and Slovene language teachers as to whether students gain as much knowledge through distance education as they would in the classroom.

As Table 5 shows, among the class curriculum teachers, 2.5% think that students gain the same amount of knowledge, 52.2% think that students gain a

little less knowledge, and 45.3% think that students gain far less knowledge. On the other hand, among the Slovene language teachers, 1.4% think that students gain the same amount of knowledge, 45.1% think that students gain a little less knowledge, and 53.5% believe that students gain far less knowledge. However, the result of the chi-square test is not statistically significant ($\chi^2 = 2.488$; $p = .288$), so we cannot claim that there is a difference in opinion between class curriculum teachers and Slovene language teachers as to whether students gain as much knowledge through distance education as they would gain in the classroom. Hypothesis 5 cannot be confirmed.

Table 5

Teachers' opinion on whether students gain the same amount of knowledge through distance education as they would in the classroom

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
Do you think that students gain as much knowledge through distance education as they would in the classroom?	yes	5	2.5	2	1.4
	no, a little less	106	52.2	65	45.1
	no, far less	92	45.3	77	53.5
Total		203	100.0	144	100.0

Note. * $\chi^2 = 2.488$; $p = .288$.

- H 6: There is a difference between class curriculum teachers and Slovene language teachers as to whether they inform parents about the students' work.

As Table 6 shows, among the class curriculum teachers, 28.1% inform parents once a week, 7.9% trust parents to check online class work and work with their child, and 64.0% contact parents if necessary. On the other hand, among the Slovene language teachers, 13.2% inform parents once a week, 6.9% trust parents to check online class work and work with their child, and 79.9% contact parents if necessary. The result of the chi-square test is statistically significant ($\chi^2 = 11.607$; $p = .003$), so we can say that there is a difference between class curriculum teachers and Slovene language teachers as to whether they inform parents about the students' work. Hypothesis 6 can be confirmed.

Table 6

Frequency and manner of informing parents about the students' work

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
Do you inform parents about the students' work?	Yes. They are given a report once a week.	57	28.1	19	13.2
	No. We trust them to check online class work and work with their child.	16	7.9	10	6.9
	If necessary I contact them (parents' evenings).	130	64	115	79.9
Total		203	100.0	144	100.0

Note. * $\chi^2 = 11.607$; $p = .003$

- H 7: There is a difference between class curriculum teachers and Slovene language teachers as to whether they feel that distance teaching makes them more mentally and physically tired than teaching in the classroom.

As Table 7 shows, among the class curriculum teachers, 88.7% feel that distance teaching makes them more mentally and physically tired than teaching in the classroom, while 82.5% of the Slovene language teachers feel the same way. However, the result of the chi-square test is not statistically significant ($\chi^2 = 2.222$; $p = .136$), so we cannot claim that there is a difference between class curriculum teachers and Slovene language teachers as to whether they feel that distance teaching makes them mentally and physically more tired than teaching in the classroom. Hypothesis 7 cannot be confirmed.

Table 7

Teachers' opinion on whether distance teaching makes them more mentally and physically tired than teaching in the classroom

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
Do you feel that distance teaching makes you more mentally and physically tired than teaching in the classroom?	Yes	181	88.7	118	82.5
	No	23	11.3	25	17.5
Total		204	100.0	143	100.0

Note. * $\chi^2 = 2.222$; $p = .136$

- H 8: There is a difference between class curriculum teachers and Slovene language teachers in how many hours per day during the week they spend preparing materials, video calls, records and lessons, etc.

As Table 8 shows, among the class curriculum teachers, 2.9% spend up to five hours on preparation, 35.8% spend five to eight hours on preparation, 35.5% spend nine to ten hours on preparation, and 26.0% spend more than ten hours on preparation. On the other hand, among the Slovene language teachers, 4.9% spend up to five hours on preparation, 29.4% spend five to eight hours on preparation, 43.4% spend nine to ten hours on preparation, and 22.4% often spend more than ten hours on preparation. However, the result of the chi-square test is not statistically significant ($\chi^2 = 3.761$; $p = .288$), so we cannot claim that there is a difference between class curriculum teachers and Slovene language teachers in how many hours a day during the week they spend preparing materials, video calls, records and lessons, etc. Hypothesis 8 cannot be confirmed.

Table 8

Number of hours per day that teachers spend during the week preparing materials, video calls, records and lessons, etc.

		Education			
		Class curriculum teachers		Slovene language teachers	
		No.	%	No.	%
How many hours per day during the week do you spend preparing materials, video calls, records and lessons, etc.?	up to five hours (less than if I worked at school according to the timetable)	6	2.9	7	4.9
	from five to eight hours	73	35.8	42	29.4
	from nine to ten hours	72	35.3	62	43.4
	often more than ten hours	53	26.0	32	22.4
Total		204	100.0	143	100.0

Note. * $\chi^2 = 3.761$; $p = .288$

- H 9: Teachers who feel better equipped to teach at a distance also have a better attitude towards teaching Slovene language at a distance.

As Table 9 shows, the value of the Spearman's rank correlation coefficient between the assessment of those teachers who feel equipped for distance teaching and the assessment of the teacher's attitude towards distance teaching of the Slovene language is 0.420, which represents a positive and medium strong

correlation that is also statistically significant ($p < .001$). We can therefore say that teachers who feel more equipped to teach by distance learning also have a better attitude towards teaching Slovene language remotely. Hypothesis 9 can be confirmed.

Table 9

Teachers' attitude towards distance teaching of Slovene language in relation to their own empowerment for distance teaching

		How empowered do you feel to teach at a distance?
What is your attitude towards teaching Slovene language by distance learning?	Spearman's correlation coefficient	.420
	p	< .001
	No.	347

- H 10: Teachers who feel better equipped to teach at a distance are also more satisfied with the communication with students remotely.

As Table 10 shows, the value of the Spearman's rank correlation coefficient between the assessment of how the teacher is equipped for distance teaching and the assessment of satisfaction with the communication with students in remote teaching is .313, which represents a positive and medium strong correlation that is also statistically significant ($p < .001$). We can therefore say that teachers who feel better equipped to teach remotely are also more satisfied with the communication with students in distant teaching. Hypothesis 10 can be confirmed.

Table 10

Teachers' satisfaction with communication with students in distant teaching in relation to their own sense of being better equipped to teach remotely

		How well equipped do you feel when you teach remotely?
How satisfied are you with the communication with students remotely?	Spearman's correlation coefficient	.313
	p	< .001
	No.	347

- H 11: Teachers who are more satisfied with the communication with their students in remote teaching also have a better attitude towards teaching Slovene language through distance learning.

As Table 11 shows, the value of the Spearman's rank correlation coefficient between the assessment of communication with students in remote teaching and the assessment of the attitude towards distance teaching of Slovene language is 0.399, which represents a positive and medium strong correlation that is also statistically significant ($p < .001$). We can therefore say that teachers who are more satisfied with the communication with their students in distance teaching also have a better attitude towards teaching Slovene language by distance teaching. Hypothesis 11 can be confirmed.

Table 11

Teachers' attitude towards distance teaching in relation to satisfaction with communication with students through distance learning

		How satisfied are you with the communication with students remotely?
What is your attitude towards teaching of Slovene language remotely?	Spearman's correlation coefficient	.399
	p	< .001
	No.	347

- H 12: Teachers who have received the necessary training for distance teaching as part of their service feel better equipped for distance teaching than teachers who have not had such training.

As Table 12 shows, the average rate of a sense of being better equipped for distance teaching was 3.38 for teachers who received the necessary training for distance teaching as part of their service, and 3.23 for teachers who did not have such training. The result of the Mann-Whitney test is statistically significant ($U = 11707.0$; $p = .017$), so it can be said that teachers who have received the necessary training for distance teaching as part of their service feel better equipped to teach remotely than teachers who did not have such training. Hypothesis 12 can be confirmed.

Table 12
Training for distance teaching in relation to a sense of being better equipped for distance teaching

Did you have the necessary training for distance teaching as part of the service?	No.	Average	No. deviation	Median	Mann-Whitney test	
					U	p
Yes	229	3.38	.720	3.00	11707.0	.017
No	117	3.23	.700	3.00		

- H 13: Older teachers have a poorer attitude towards teaching Slovene language remotely.

As Table 13 shows, the value of the Spearman's rank correlation coefficient between age and the assessment of attitude towards distance teaching Slovene language is -.129, which represents a negative and weak correlation and is statistically significant (p = .009). We can therefore say that older teachers have a worse attitude towards teaching Slovene language by distance teaching. Hypothesis 13 can be confirmed.

Table 13
Teachers' attitude towards distance teaching Slovene language in relation to age

		Age
What is your attitude towards teaching Slovene language by distance teaching?	Spearman's correlation coefficient	-.129
	p	.009
	No.	340

- H 14: Older teachers feel less well equipped to teach remotely.

As Table 14 shows, the value of the Spearman's rank correlation coefficient between age and the assessment of a sense of being well equipped for distance teaching is -.291, which represents a negative and weak correlation and is also statistically significant (p < .001). We can therefore say that older teachers feel less well equipped to teach by distance learning. Hypothesis H 14 can be confirmed.

Table 14
Older teachers' sense of being well equipped for distance teaching

		Age
How well equipped do you feel to teach by distance learning?	Spearman's correlation coefficient	-.291
	p	< .001
	No.	340

Conclusion

Slovene plays several roles in the educational process in the Republic of Slovenia, including its role as a subject in its own right in the curriculum. It is a basic general education subject in public primary schools and has the most hours of all of the subjects. We conducted empirical research, in the context of which primary school teachers (N = 348) who have the necessary training to teach their mother tongue – class curriculum teachers and Slovene language teachers (the former for the first and second three-year period, and the latter for the second and third three-year period) – answered a survey questionnaire. In the first part, we verified the attitudes of the teachers towards distance teaching, in the second part we were interested in the organisational and technical aspect of distance teaching, in the third part we studied the didactic aspect of teaching, in the fourth part we were interested in the teachers' observations about students' work and cooperation with parents in distance teaching, and in the fifth part we verified the opinions of the teachers about their own work (distance teaching).

More than half of the teachers surveyed have a good attitude towards distance teaching (scoring 3 out of 5), and more than half of them believe that they are well equipped for this type of distance teaching (scoring 3 out of 5). Regarding communication with their students at a distance, 72% of the teachers are satisfied or very satisfied. A total of 65% of the teachers stated that their employer provided them with the appropriate technical support, and 66% had the necessary training for distance teaching. Most of the teachers use ZOOM for distance teaching, followed by MS Teams and Arnes online classrooms, while many also use email. When they were asked how they choose content from the curriculum that is suitable for distance teaching, most of the teachers (38%) answered that it is their own decision, while 20% follow an interactive curriculum and the rest combine similar content. The most common forms of teaching are classroom led, individual and group work, and the least common is pair work. In terms of teaching methods, the best represented methods are explanation, work with

text and conversation, while the least represented are demonstrations, roleplays and graphic work methods. The teachers are also aware of the importance of implementing differentiation and individualisation. Regarding the assessment of knowledge, the majority of the teachers (64%) answered that they did not perform assessments according to the recommendations, followed by teachers (24%) who made verbal assessments. Only 9% of the teachers assessed knowledge in a different way (authentic assignments and speech assignments), while 2% used certain programs, applications and tools. As many as 86% of the teachers answered that they felt that distance teaching made them mentally and physically more tired than teaching in the classroom. Most of them (38%) stated that they spent nine to ten hours per day on distance teaching, followed by teachers who worked five to eight hours per day (33%) and those who worked more than ten hours per day (25%). Among the advantages of distance teaching, the teachers mentioned greater use of modern information and communication technology (64%), more use of e-material (22%) and the opportunity for formative monitoring of students (14%). Among the biggest problems in respect to distance teaching (Slovene language), the following are mentioned: lack of student participation (31%), lack of non-verbal communication thus creating difficulties in understanding (29%), and technical problems (13%).

Using various statistical calculations, we verified and established the following hypotheses. There is a difference between class curriculum teachers and Slovene language teachers in how they assess knowledge and whether they inform parents about the students' work. Teachers who feel better equipped to teach remotely also have a better attitude towards teaching their mother tongue by distance teaching and are more satisfied with the communication with their students in distant teaching. Teachers who are more satisfied with the communication with their students in distant teaching also have a better attitude towards teaching Slovene language remotely. Teachers who have received the necessary training for distance teaching as part of their service feel better equipped for distance teaching than teachers who have not had such training. We also found that older teachers have a poorer attitude towards teaching Slovene language remotely and feel less well equipped for this kind of teaching.

We find that teachers who teach their mother tongue have responded very well to the challenges of distance teaching, and although they feel that this makes them more mentally and physically tired than teaching in the classroom, they have a good attitude towards this type of teaching, which is probably partly due to the fact that they feel better equipped for distance teaching work (teaching). The results of the research are also important when it comes to the practical aspect of distance learning, because such research, especially regarding the opinion of mother tongue

teachers on teaching Slovene by distance learning, is not yet available. Through the results presented in this discussion, teachers can learn about the opinions of other teachers who are in the same situation as themselves. They will be able to adopt ideas or examples of good practice from them, get information on how different problems (substantive, organisational and technical, amongst others) are solved by their colleagues who teach the same subject and are in a similar situation, gain insight into different didactic aspects of distance learning, learn about the experiences of other teachers regarding work with parents in distance learning, and discover what other teachers across the country think about the nature of their own work by distance learning. As we learn from each other all the time, comparisons between class curriculum primary school teachers and Slovene language teachers who teach their mother tongue in public primary schools using the same curriculum will also help them to improve their own practice.

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Biographical note

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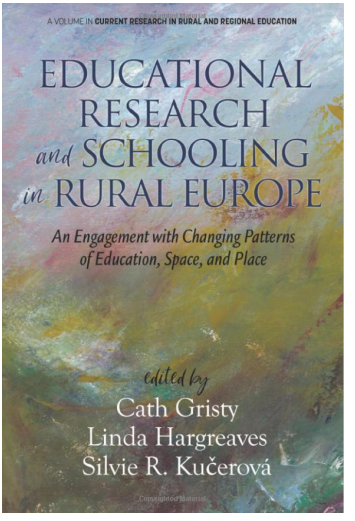
Cath Gristy, Linda Hargreaves, and Silvie R. Kučerová, *Educational Research and Schooling in Rural Europe: An Engagement with Changing Patterns of Education, Space and Place*, Information Age Publishing, 2020; 406 pp, ISBN: 978-1-64802-163-3

Reviewed by Laurence Lasselle[1]



The book *Educational Research and Schooling in Rural Europe: An Engagement with Changing Patterns of Education, Space and Place* is a collection of papers authored by researchers across Europe. Edited by three outstanding researchers on rural schooling – Drs Cath Gristy, Linda Hargreaves and Silvie Kučerová – it brings together contributions of scholars from a range of social science disciplines, including education, geography, pedagogy, psychology and sociology. All of the authors have participated in one of the annual European Conferences on Educational Research (ECER) organised by the European Educational Research Association (EERA), in particular the sessions co-ordinated by the EERA Network 14: Communities, Families and Schooling in Educational Research.[2]

The book provides a solid account of the contexts and challenges of European rural schools and their communities in eleven European countries (Austria, Czechia, Finland, Hungary, Italy, the Netherlands, Norway, Poland, Serbia, Spain and the United Kingdom) prior to the Covid-19 pandemic. The foreword written by Kvalsund and the introduction by Hargreaves leave the reader with no doubt that the book sits firmly within the literature defying the 'deficit' view of rurality, which has been growing steadily over the past fifteen

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2 Dr Linda Hargreaves founded Network 14 with Professor Rune Kvalsund more than 25 years ago. Alongside Rune, Linda's contribution was essential for the development and consolidation of the network.

years (see also, *inter alia*, Roberts & Green, 2013 or Cuervo, 2016).

The deficit approach is rather limited and seems to lead to the same type of actions among policymakers with regard to rural schooling: the closure of rural schools. In this setting, urban educational provision fixes the norm, while rural educational provision is studied as 'non-urban' provision and is perceived as a problem. Falling short of the normal standard, it somehow needs to be modified, so it starts to move towards the benchmark. Through this lens, a rural school is too costly to run due to its size, making it inefficient and unsustainable in the long run. The chosen action is closure, thus enlarging a 'nearby' school.

An alternative approach that nuances this dichotomy and allows the rural to be considered on its own merits could avoid this trap, and this is exactly what the present book proposes: significant rural education research promoting rural education, thus making them both visible. The book's message is clear: researching schooling in rural communities should not be marginalised. It promptly points out to the reader (or reminds them) that: (1) most areas in the European Union (EU 28) are rural (92%), and rural regions are home to a significant proportion of EU 28 residents (28% in 2015 according to Eurostat (2018, 2020)); and (2) "*Despite national variations, educational gaps*[3] *between rural and cities populations are consistent and widening*" (p. 4).

As the reader progresses through the book, the guidance of the editors is felt. Each contribution is organised similarly: contributors define the concept of rural, and then describe the context and significance of rural education, the principal drivers of educational change in rural areas, and the nature and status of research on rural education provision. This pattern helps the reader to determine 'common features' on educational research and schooling in rural Europe. Firstly, there is no unique definition of 'rural' and 'rural schools' across Europe: the notion of rural depends on population size and density, while rural schools are often characterised by their size and location. Secondly, the rural schooling experience across Europe over the last five decades has been very diverse. The reader can fully appreciate this diversity from the different research perspectives and research questions due to the discipline heterogeneity of the contributors. Thirdly, a common pattern of change is clearly identified: rural school closure in the name of efficiency (cost saving) and/or improved quality of education provision. Throughout the book, the contributors systematically report a reduction in the number of rural schools since the middle of the twentieth century. This has occurred independent of place and is especially marked

3 The gaps are measured in terms of early school leaving rates among 20–24-year-olds; 18–24-year-olds who are not in employment, education or training; or 30–34-year-olds who have completed tertiary education.

in Central and Eastern Europe. All of the contributions help the reader to gain a better understanding of the impact of rural school closures in their respective communities, while some of them elaborate on the communities' responses and the lessons drawn by policymakers.

The book has four parts and contains sixteen chapters. The first part (Chapters 2 and 3) characterises rural education in Europe. The second part (Chapters 4 to 12) presents a series of case studies, not only from Western Europe (Austria, Finland, Italy, the Netherlands and Spain), but also from four countries that emerged from former socialist states (Czechia, Hungary, Poland and Serbia). The third part (Chapters 13 and 14) analyses schooling in rural settings from the theoretical lenses in England, while the fourth and final part (Chapters 15 and 16) serves as a conclusion.

Part I provides an overview of rural education issues across Europe. Chapter 2 highlights the factors influencing elementary systems in the eleven countries represented in the book, distinguishing education policy factors from political and economic factors, as well as physical geographic and sociocultural factors. It stresses how diverse rural education is in the countries studied in terms of conditions and spatial distribution (thus providing strong arguments for the importance of examining rural issues from a collection of case studies). This distinction facilitates the understanding of the context of and responses to school closures presented in the following chapters: clustering strategies, communities' resilience (or fatalism?), and the degree of autonomy of the local authority (and conversely the degree of centralisation). Chapter 3 offers a comparison of the effects of globalisation in rural communities in Finland and Norway. It notably investigates the impact of school closures on children's commutes to school and on their physical and mental health. It also examines school-community relationships and how their strength can influence the school closure process.

Part II has 9 chapters. Each chapter proposes an examination of rural schooling in a specific country over several decades, often accompanied with the comprehensive analysis of a case study. Chapters 4 to 7 focus on four Central and Eastern European countries, while Chapters 8 to 12 deal with five Western European countries.

In the four Central and Eastern European countries, the post-socialist era is characterised by decentralisation of policymaking at different speeds, but with similar outcomes: the significant closure of rural schools. Chapter 4 explains how the radical reforms in Hungary have reshaped the rural school network at the expense of many children, especially Roma children. Chapter 5 proposes the insightful use of geography of education, detailing the

changing spatial distribution of primary education provision over several years in Czechia. Chapter 6 stresses the degree to which the transfer of the running of primary schools to the hands of local authorities in Poland has been especially challenging for rural communities. Chapter 7 is devoted to Serbia, perhaps a less familiar country, as it is still negotiating its membership to the European Union, constructively making the case for the improvement of Serbian rural education provision by suggesting seven changes. It concludes with a presentation of the concept of *rural educational tourism* aimed at supporting local communities.

The following chapters lead the reader to the better-known territories of Western Europe, which have also been characterised by significant closures of rural schools over the past fifty years. Chapter 8 presents a remarkable account of the changes in terms of perceptions of rural schools and policymaking in Spain over five decades. It notably examines the lasting effects of the deficit view on Spanish rural schools in the 1960s and highlights how the recognition of educational contexts has led to some innovative strategic initiatives for working in small rural schools. Chapter 9 points out a surprising effect of the use of the Montessori concept to prevent the closure of small rural school in Austria. If the brand attracts new pupils, it may deter the locals. Chapter 10 explains how the isolation of schools in remote Italian mountains or on small islands could be overcome by the use of distance learning activities. Chapter 11 describes the practice of amalgaming small schools in the Netherlands and analyses the subsequent relationship between small school principals and multi-board schools. The final chapter of Part II turns the attention of the reader to Finland and school network planning, giving an enlightened account of how recent changes in the consultation process in school planning can develop new understandings between the local community and policymakers.

Part III highlights how theoretical concepts developed by Bourdieu (Chapter 13) and Lefebvre (Chapter 14) can offer new understandings of case study research. Both of the case studies referred to took place in England over a period of three years. It is instructive to read about the change in the degree of the interaction/engagement of a (primary) headteacher with the local community over this period (Chapter 13), and about the role school played in the lives of young people in an isolated village, highlighting the negative discourse of the inhabitants and the picturesque representation from outsiders (Chapter 14).

Last but not least, Part IV ends the book on a useful note with two chapters and an appendix. The two chapters offer an excellent summary of the changing patterns of education, space and pace detailed throughout the book (the use of Kvalsund and Hargreaves' (2009) space and time typology of

research designs is particularly judicious) and the innovative strategies identified by the contributors. The short appendix provides a much-needed discussion around the 'migrant crisis in Europe', a theme largely unaccounted for in the previous parts of the book and too often viewed as a threat by mass media and politicians.

Overall, the book offers an excellent overview of educational research and rural schooling in Europe. It is an essential book for experienced researchers and early career researchers in the field, as well as anyone wishing to work in the field in the near future or simply wanting to learn more about the topic. Part II is perhaps the book's strongest asset, with a special accolade to the chapters on Central and Eastern European countries, as educational research from these countries remains under-reported in the Western European educational literature. In any case, any reader unfamiliar with the education system of the country studied and/or with the related literature (often inaccessible due to the language barrier[4]) will benefit from the encounter with them, while the variety of research methods used by the different contributors allows the reader to appreciate the methodological breadth of the field. In addition, as the contributors belong to distinct academic disciplines, the range of topics and their contrasting discussions guarantee very enjoyable reading.

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4 One of the objectives of the book is to ensure that the contributors are citizens of the nation states they present.

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