




A Case Study on Online Teaching during the Covid-19 Pandemic Perceived by Primary School Teachers

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ABSTRACT

Research shows that teachers are one of the most influential factors in student learning in online classrooms during the COVID -19 pandemic and discusses teachers' efforts to get the most out of their online classrooms with their students. However, how the teachers experience online teaching is understudied. To address this concern, this case study aimed at revealing the experiences of primary school teachers in online teaching during the COVID-19 pandemic with a particular focus on the difficulty in teaching different subjects such as mathematics and science. The participants were 12 primary school teachers working in different places (e.g., village and district) with various professional experiences in years (such as 1-10 years and 11-20 years). The data was generated through semi-structured interviews and analyzed by content analysis. The results revealed four main themes, namely guidance and support, planning and instruction, technical issues, and the use of technological tools. Since most of the results were contextual, it is suggested that schools provide some school-based training to support teachers and parents in this process. When the results of the research are evaluated, it is important that university teacher education departments provide comprehensive pedagogical support, especially for pre-service teachers who will be the teachers of the future and families to improve online learning.

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Keywords:

Primary education, distance learning, online learning, technology, case study, COVID-19

1. Introduction

It was declared a global pandemic by the World Health Organization on March 11, 2020, due to the New Coronavirus Disease (COVID-19), which emerged in Wuhan, China and showed its effect on other countries (World Health Organization [WHO], 2020). The rapid spread of the pandemic in the society had negative impacts in many areas of human life, particularly health, economy and education. In this context, countries have taken a series of decisions and various measures to minimize the impact of the global pandemic on social life and prevent the pandemic's further spread. The transformation of educational activities from face-to-face education to distance education is one of these measures, which affected many teachers and students all around the world.

Due to the pandemic, the distance education decision started to be implemented in China on February 16, 2020. It spread to 45 countries on March 13rd, and became more widespread on March 26, with 166 countries closing schools at all education levels and planning a transition from face-to-face education to distance education. Finally, on April 1, 2020, with 172 countries, the countries implementing distance education reached the highest number (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020a). Turkey is among the countries that face a rapid transition to distance learning education in this pandemic

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process. The Turkish Ministry of National Education (MoNE) has broadcast through Turkish Radio and Television channels, TRT kindergarten, TRT elementary school, TRT middle school, and TRT high school, and continues to actively use a Turkish learning management system EBA as of March 23 (see Ministry of National Education [MoNE], 2020d). Distance education continued synchronously and asynchronously until May 31 (MoNE, 2020b); then, the students entered the summer vacation period.

To increase the quality of online education, the Ministry of National Education in Turkey has made improvements in the Internet infrastructure, and software as well as providing necessary hardware to schools just upon the launch of distance education. After the summer, education started. A complimentary online education programme was implemented to teach the missing subjects and objectives of the second term of the 2019-2020 academic year as of August 31, 2020 (MoNE, 2020d). The online education process has been a transition in education levels from as early as primary school to upper secondary school (see MoNE, 2020c; 2021a). With this transition process, in addition to asynchronous videos and sources, synchronous learning-teaching environments were provided to students and teachers with live lessons on EBA. Support points are established for students who do not have the necessary mobile phones, tablets or computers, and tablets have been provided to 650.000 students (MoNE, 2021b). For those who do not have an Internet connection, the Ministry of National Education has made agreements with the GSM operators and provided 6 GB to 8 GB Internet to be used on EBA channels (MoNE, 2020a). Moreover, the provided 650.000 tablet computers also have a monthly 25 GB capacity GSM internet service that students will need to benefit from the live lesson and EBA platform (MoNE, 2021b). Online lessons in the COVID-19 process led teachers to face with the need to use technological tools extensively. According to the researchers, many teachers worldwide had little experience or training on online teaching platforms and tools before the COVID-19 pandemic (e.g., Yu, 2020). Yu (2020) argues that most of the teachers gained necessary online teaching skills during the online education process 'when they were actually using online teaching'. Considering this argument, the focus of this study is to reveal the experience of primary school teachers during online teaching. The Ministry of National Education in Turkey continued following the policy of integrating STEM education into primary school teaching during the Covid-19 pandemic through various projects such as Scientix and Edusimsteam (MoNE 2021c; 2021d).

1.1. COVID-19 and Online Education Process

Since the beginning of the COVID-19 pandemic, governments and education actors have started developing systems to provide education and training activities remotely. Looking at the latest data, it is seen that more than 90 per cent of the Ministries of Education around the world started to use distance learning approaches that include radio, television or the Internet. At the global and regional levels, most students (about 70 per cent) continue their education in an environment that allows them to learn remotely through digital or asynchronous broadcast classes at home (UNICEF, 2020b). At the same time, students and teachers in many countries have had to move quickly from traditional classrooms to online classes without enough time to adapt to these changes (Sykes, 2020). COVID-19 has transformed homes worldwide into classrooms within weeks, if not days, and many schools have had to create overnight distance learning programmes and resources. It is argued that the transition to home learning in such a short time without any warning or advance preparation has raised concerns that will become a focal point for researchers, educators, policymakers, and anyone interested in the education and social welfare of young people in the coming years (Bayrakdar & Guveli, 2020). At the beginning of these concerns were whether students could realize their learning with online education, whether students and teachers had sufficient technological equipment and infrastructure to participate in online training, and whether teachers and students could use technology effectively.

Considering the studies in the literature, it is known that before COVID-19, there were some needs of particularly in-service teachers (Sarı & Akbaba-Altun, 2015; Sarı & Keser, 2021), pre-service teachers (Saralar et al., 2018; Saralar-Aras & Güneş, 2022) and teacher educators at universities (Amhag et al., 2019); these were reported in various countries including Sweden and Turkey. The transition to online teaching with the COVID-19 process has left teachers with an experience most of them have never encountered before. According to Sykes (2020), many teachers in Japan have little or no teaching experience from home. For teachers who have not taught online before, fully online teaching has undoubtedly been a challenge (Sykes, 2020). For instance, in a study conducted in Chile (Sepulveda-Escobar & Morrison, 2020), teachers had to learn how to work with previously unfamiliar software and tools to prepare teaching materials for the courses they will give in the COVID-19 process. The transition to online education with the COVID-19 crisis has also created

challenges for families and students. There have been changes in working hours in line with the working from home regulations. These changes have led to problems. These include the inadequate relationship of parents (who work from home) with their children even when both are at home, the installation by parents of technological devices for teaching their children online, and the difficulty of complying with schools' online regulations (Haekkilae et al., 2020).

The COVID-19 crisis has shown most of the education systems under the OECD's 2018 International Student Assessment Program (PISA) are not ready for the world of digital learning opportunities (Schleicher, 2020). Considering that teachers need to be prepared to integrate technology into their teaching and to teach online (Cooper et al., 2020) to meet the needs of their future students, the current study aims to reveal the experiences of primary school teachers who have used distance education completely during the COVID-19 process, and it is considered important in terms of shedding light on not only researchers but also policymakers and educators.

2. Methodology

2.1. Research Model

The study was conducted in a case study design, as it was aimed to reveal the contextual experiences of primary school teachers in online education during the COVID-19 pandemic process. Particularly, in this multiple case study where 12 participants took part, the purpose was to classify teachers' experiences in online teaching as themes. The themes were depending on the case(s), which were observed in the majority of the cases within a certain period. The data was generated through interviews and documentation in their natural environment as suggested by Creswell (2007). With the help of a case study design, the current situation was investigated in a real context: online teaching environments (Yin, 2004). In short, a case study design was used in the current study to address the experiences of primary school teachers in online education during the COVID-19 pandemic process.

2.2. Research Sample

Criterion sampling, one of the purposeful sampling methods, was used in determining the participants (Yıldırım & Şimşek, 2013). The criterion was set to choose the experience of elementary school teachers in years 1-10, 11-20, and 21 and above. In addition, the second criterion selected in the study was teachers' places of work (villages, district centres, and provincial centres) to understand whether experiences in the online teaching process differed in relation to the different teachers' settlements. These teachers teach lessons including mathematics, science and social sciences. The characteristics of the participants were given in Table 1. In Table 1, FT represents a female teacher and MT represents a male teacher.

Table 1. *Information about Participants*

Pseudonym	FT	FT2	FT3	FT4	FT5	FT6
Experience (In years)	3	5	7	8	16	24
Place	Village	Province	District	District	District	Province
Pseudonym	MT1	MT2	MT3	MT4	MT5	MT6
Experience (In years)	6	6	6	11	17	20
Place	Village	Village	Village	Village	Province	Province

As seen in Table 1, a total of 12 primary school teachers were interviewed within the scope of the study. 6 of the teachers were male and 6 were female. The teacher with the lowest experience had 3 years of teaching experience, and the teacher with the highest experience had 24 years of teaching experience. 6 of the teachers worked in a village, 3 in a district centre and 3 in a city centre, coded as a province in Table 1. All teachers had been using online teaching since August 30, 2020 due to COVID-19 measures.

2.3. Data Collection Tools and Procedure

The research data were collected using open-ended semi-structured interview questions. In this context, two demographic questions (teaching experience and place of duty) and one basic question were asked to the teachers, and parallel to this question, questions were posed at the end. The main questions asked to teachers in the interviews are as follows: How did you experience the online education process as a primary school

teacher during the COVID-19 pandemic? Were there any lessons such as mathematics and science you found particularly difficult to teach online? Interviews were conducted through a program enabling online interviews, started after getting permission from the teachers. The shortest of the interviews was about 30 minutes and the longest was 40 minutes.

2.4. Data Analysis

The data were analysed by the content analysis method. The audio recordings of the interviews, which were primarily recorded as videos, were transferred to the computer environment, and a total text of 126 pages was obtained. In the second stage of the analysis, the data were encoded. In the light of the codes that were defined in the third stage, themes (which can explain the data in general and collect the codes under certain categories) were found. The data were organized and defined according to codes and themes in the next stage. Themes and sub-themes are also visualized. Findings were interpreted in the last stage, where direct quotations supported research findings.

2.5. Ethical Concerns and Trustworthiness

Necessary ethical permission was received from the ethical community of the first authors' university prior to the study. The Ethics Committee of the School of Education at that university approved this study. The study did not cause any concerns for the committee. Ethics was received on November 11, 2020; Ref: 9872/20.

In providing transferability in this qualitative study, sampling and detailed/rich description strategies were used (Merriam, 2013; Yıldırım & Şimşek, 2013). In the purposeful sampling, teachers who had at least 3 years of teaching experience at the time of the data collection and continued to teach through online channels during the COVID-19 process constituted the study participants. The purpose of choosing these participants is to think that they will be more effective in revealing the issues as they are experienced in years and experienced in online teaching.

The purpose of including teacher groups with different teaching experiences in the study is to understand primary school teachers' perspectives from various experiences (in years). In the detailed description, the points made by each teacher in the interviews were accurately reflected, and the ideas expressed by the teachers were presented in bold descriptions under the themes. Participant and expert confirmations were used as part of the reliability (dependability) of the study (Merriam, 2013; Yıldırım & Şimşek, 2013). The obtained subjects were recoded by an expert other than the researchers. Inter-coder reliability was calculated using the formula $[\text{Consensus} / (\text{Consensus} + \text{Disagreement}) \times 100]$ suggested by Miles and Huberman (1994). It was found that the agreement between the researchers' and the expert's assessments was 84%, which is high enough to report reliability. Nevertheless, topics and subtopics where the assessments differed were reviewed and the agreement between the researchers' and the expert's assessments increased to 88%.

3. Findings

This study revealed the experiences of online education during the COVID-19 process from the perspective of primary school teachers. The teachers found the lessons they teach in similar difficulty; that is to say, they did not find e.g., teaching mathematics more difficult than teaching social sciences. Instead, they reported more general issues. These findings were collected under 4 main themes. These are as follows: guidance and support, planning and teaching processes, technical issues, and the effective use of technological tools. The four main themes, emerging regarding the primary school teachers' experiences of the online education process, were also divided into sub-themes (see Tables 2 to 5). In this context, the first main theme was guidance and support. Sub-themes obtained within each main theme were discussed in the following sub-titles.

3.1. Guidance and Support

Guidance and support theme had three main sub-themes (Table 2). The first was about teachers' guidance where teachers stated that they guided parents through various platforms in order for them to guide their children in the distance education process. The 12 participating teachers indicated that this consultation takes time and parents need to better manage their time, especially if they have more than one child, as all children in the distance education process need their parents' time and attention at times.

Regarding parental guidance and support, the lack of parental interest in online instruction was seen as an important problem by elementary school teachers. At the same time, it is stated by more than half of the teachers that seeing only mother support in online education was in this process caused insufficient parental guidance and support. It is emphasized that only maternal support was more common for students residing in rural areas and villages. Inadequate level of family support for homework (given by teachers after online education) was another important parent-related problem, where according to participants, some parents showed enough support for homework while some other provided almost no support. Regarding this, the teachers stated the following:

FT4: Some parents may be irresponsible that they always have an excuse. Even the most responsive parents can inevitably slack off and not want to help their children... I believe that children's learning should be in the hands of children, but should also be supported by parents. As far as I see, this support was usually by mothers for my class. This also was hard... For example, one day, the mother was sleepy, hence her child did not attend the morning classes. The child got up and texted me, but she could not join the class because the mother was sleeping.

MT5: For example, I gave homework to my students, and asked the parents to send me the children's work. Some of the parents sent photos of homework to me without checking them.

The study participants stated that the teachers also got some support from their schools. These included the use of the materials and resources in EBA and included technical support for how to use related technologies. Many participants were also aware that detailed teacher training sessions describing distance education and EBA use have been prepared by the ministry and made available to them from the EBA Professional Development Area. Some of the teachers also stressed that they were encouraged to participate in professional development groups, providing an effective environment for project groups and interacting with colleagues.

Table 2. *Sub-themes and Codes of Guidance and Support Theme*

Theme	Sub-theme	Code
Guidance and Support	Teacher	Time management
		Parental demands
		Parent indifference
	Parent	Support for homework
		Single parent support
		Materials and resources
	School	Technical support

3.2. Planning and Teaching

The second of the main themes that emerged within the scope of the study was the planning and teaching processes. This main theme consisted of three sub-themes: planning of teachers, parents and students (Table 3).

One of the sub-themes that emerged in the planning and teaching process was teachers' planning and teaching. All of the participating teachers stated that they used technology more in their courses with distance education, thus they learned a lot by practising and discovered various sources, which, according to them, had a positive effect on their technology, pedagogy and content knowledge.

Another sub-theme was the intervention of parents in teaching while conducting online lessons. Most of the participating teachers emphasized parental interventions, saying that some parents answered teachers' questions during online classes, some parents intervened in online classes by doing some activities, such as feeding their children and asking questions outside the classroom while students were sitting on the screen. Another important parental problem was that some parents did not have sufficient knowledge of technology, in other words they were not technology-literate. To illustrate, two of the participants stated the following:

MT5: Parents, for example, I was just starting the live lesson. The parent sat next to her child and said the answer to the first question is "a". I experienced this. Another example is that I asked students to turn the page, and the parent did not let her son turn the page and asked me a question. My response was to say that she could not intervene in the class.

FT6: Some parents give true and false information about the answer to my question, true or false, parents' answers were such a disadvantage. The biggest disadvantage is that this kid may not talk freely.

Interest and focus were the two main points that almost half of the participants emphasized. Considering the student-related issues, which is the last sub-theme, according to the teachers, students were not interested in the lessons in the online education process and they could not focus on the screen in the online education process. Furthermore, apart from the online education process, the participants saw students' failure to complete their homework as an important problem.

MT6: We need to keep children's attention on the screen, which, for some of the students, is a boring environment. Some of the children cannot stand still and move around during live lessons. There was also one child who listened to the lesson, but he kept rocking on a chair while listening to the lesson. MT3: I think it has been a bit difficult for the students to focus during online education right now...both looking at the phone and writing it down in their notebook or something might be hard for the students... And I turned off the voices during some of the lessons because sometimes there is a lot of noise from behind, for example, today, a student's house's roof was repaired during the live lesson.

Table 3. *Sub-themes and Codes of Planning and Teaching Theme*

Theme	Sub-theme	Code
Planning and teaching	Teacher	Technology, pedagogy and content knowledge
		Parental intervention to teaching
	Parent	Technology literacy
		Single parent support
	Student	Interest toward lessons
		Focus problems
		Homework
		Technology literacy

3.3. Technical Issues

Under the main theme of technical issues in online education during the COVID-19 process, the analysis of the interviews with 12 participants found four sub-themes which were (a) hardware and (b) software problems, (c) Internet connection problem and (d) power outages (Table 4).

As seen in Table 4, the first of the most common hardware problems encountered in online education during the COVID-19 process was that the microphone does not work. This issue, which almost all primary school teachers frequently emphasize, was encountered especially by children residing in rural areas and villages. According to the participants, it can be said that parents and students could not turn on or use the microphone due to the lack of parents' and students' technological literacy skills.

MT4: When I was taking attendance, sometimes, students start talking, and some other times student seems that he is in the live lesson but there is no sound, and there is no image. Students and parents need to learn about turning their microphones and cameras on.

FT5: ... Apart from that, a few of my students still have microphone problems, and I continue to my lesson without hearing their voices. And at the middle of the lesson, when everyone is fully concentrated, one of the parents manages to work her child's microphone on, and all students hear echo and disruptive voices that interrupt the teaching.

In the subtheme of software problems, errors received in online education software were mentioned as the most common problem encountered in online education during the COVID-19 process. In particular, problems such as screen freezing, sound turning on and off, no sound and teacher's/students' screen sharing which were not seen by the other students/teacher were the most commonly mentioned software errors.

MT3: First of all, the phone issue in children, they joined online lessons with the phone, and when we project a screen on the system, they may not see it from there.

MT6: Because some of the students are connected with the phone, the screen is small, and their screen is not large enough to see what we share.

Table 4. *Sub-themes and Codes of Technical Issues Theme*

Theme	Sub-theme	Code
Technical issues	Hardware problems	Broken microphone
		Broken screens including black screen problem
	Software problems	Battery/charge problem
		Errors received in online education software packages
	Internet connection	
	Power outages	

3.4. The Use of Technological tools

The last main theme obtained from the research findings was the use of technological tools. Within this main theme, teachers', parents', and students' use of tools were classified (Table 5). After some practice, teachers mostly did not need help and effectively used the technologies. Regarding this, one of the teachers said:

FT4: Frankly speaking, apart from these technological failures that I said at the beginning (microphone issues etc.), I did not experience such a big problem.

The problem of using technological tools (as well as concrete manipulatives during online teaching) was observed by most parents, especially mothers who felt responsible for their children's online teaching during the COVID-19 process, especially in the young groups (grades 1 and 2, corresponding to ages 5.5 to 7). Parents and primary school students prepared for online lessons together and dealt with both hardware (ineffective use of tablets, cameras, microphones etc.) and software (difficulty of logging into digital learning platforms) problems together. Hence, students experienced the same problems with their parents.

Table 5. *Sub-themes and Codes of Technological Issues Theme*

Theme	Sub-theme	Code
The use of technological tools	Teacher	Software
		Hardware
	Parent	Software
		Hardware
	Student	Hardware
		Software

4. Conclusion and Discussion

The findings of this study, which aimed at describing experiences of primary school teachers who continued education through online platforms during the COVID-19 process, were collected under four main themes. These were listed as guidance and support, planning and teaching, technical issues, and technological tools. According to the participants, there were positive (e.g., receiving guidance and support when needed and learning more about educational technologies) and negative experiences (technical issues such as microphone and camera problems).

In terms of research findings, the first finding was that it was not a problem for students in more developed regions to gain access to hardware resources and the Internet. These research findings support the findings of the international literature (Ali & Kaur, 2020; Janssen, 2020; Li & Lalani, 2020; Schleicher, 2020; UNESCO, 2020b; UNICEF, 2020a). The COVID-19 crisis revealed many inequalities in many countries, such as lack of access to computers and the Internet (Janssen, 2020; Schleicher, 2020). Teachers also reported that primary school students had issues with turning on their microphones and cameras. It was also observed that the parents did not have enough knowledge and skills to eliminate these problems. Considering these problems, a question comes to one's mind: "Are primary school students and parents at a sufficient level of technological literacy in online education?" Considering the findings in the studies of international literature, it was seen that similar problems were experienced in different countries in online education during the COVID-19 process (Ali & Kaur, 2020; Anwar et al., 2020; Yu, 2020). According to Yu (2020), the transition to online learning in China has brought some difficulties, especially for young students and their parents. Young children often lack the skills required for online learning entirely. They have lower competence in using technological tools and following teachers' instructions online (Yu, 2020). Similarly, in Pakistan, lack of family

support, technological skill problems and technical problems in online education appeared as the problems experienced in distance learning during the COVID-19 process (Anwar et al., 2020).

Parent indifference was also a major problem in the COVID-19 process. Family support was insufficient in homework during the online education, which resulted in many students not doing their homework. It was observed that only mother support was more common among students residing in rural areas and villages, rather than both parents' support – despite having the necessary knowledge and skills. Having busy parents and/or no parents at home was likely to emerge as another major problem. For example, some of the online lessons were in the morning and mothers were busy with housework or the needs of other household members during these hours. Similarly, in a study conducted in Pakistan, the absence of family support in online education emerged as a big problem (Anwar et al., 2020).

For this reason, Spoel, Noroozi, Schuurink and Ginkel (2020) suggested increasing the number of guidance and support services provided by teachers to parents; hence, undoubtedly, with this process, there would be so much time pressure and increase in the workload of the teachers. Therefore, technology and online learning tools have been complementary teaching materials for teachers to use in classrooms (Wan, 2020). Especially during the COVID-19 process, the necessity to give online lessons has increased the importance of being competent in technology, pedagogy and content knowledge, in short TPACK.

Finally, it was observed that parents did not have sufficient technological knowledge. Parents also had difficulty in finding a solution immediately when they encountered software and/or a hardware problem (turning microphone and camera on-off etc.) during online courses. In addition to these, parents' intervention (giving answers to teachers' questions, feeding their children, distracting teaching with extracurricular questions, etc.) in teaching during online lessons and extracurricular activities was seen as a major problem for teachers. Wan (2020) emphasized that parents should be educated to help and guide children with the COVID-19 pandemic. Children of less-educated parents were at a disadvantage in this process; they were left on their own and needed help with how to take advantage of digital tools (Wan, 2020).

5. Recommendations

Students' indifference to the lessons in the online education process, inability to focus on the screen, not doing homework, and low technology literacy were the problems experienced in the planning and teaching process. It could be said that online education was a disadvantage especially for young children during the COVID-19 process. As Yu (2020) stated, young children completely lack the skills required for online learning and are less capable of using technology and following teachers' instructions; they do not always have the self-discipline to stay away from distractions. For this reason, it was emphasized that a structured environment is necessary especially for young children not to be easily distracted (Li & Lalani, 2020). Such an environment could be compared with the common teaching environments through a quasi-experimental study which could provide more information and an opportunity for generalising.

Considering the effective use of technological tools revealed within the scope of this study, parents and students experienced problems in using both software and hardware tools. These problems were mostly experienced by mothers and students in younger age groups (1st and 2nd grades). Regarding this, it may be suggested to update related teacher training courses at the universities to prepare pre-service teachers to teach with technology when they graduate. Moreover, particular short courses for parents could be planned. Researchers may design these courses, and further research may explore their effectiveness.

Last but not least, it is important that the teacher training departments of the universities provide especially pre-service teachers with comprehensive pedagogical support to improve online teaching. According to Sepulveda-Escobar and Morrison (2020), the COVID-19 crisis has demonstrated the importance of practical and adaptive focus teacher training and how the emerging disruptions caused by the COVID-19 pandemic can be used as an opportunity to reshape the role of teacher education.

6. References

- Ali, W., & Kaur, M. (2020). Mediating educational challenges amidst the Covid-19 pandemic. *Asia Pacific Journal of Contemporary Education and Communication Technology*, 6(1), 40-57. https://apiar.org.au/wp-content/uploads/2020/08/4_APIJECT_V6_I2_2020_pp.40-57.pdf

- Amhag, L., Hellstrom, L., & Stigmar, M. (2019). Teacher educators' use of digital tools and needs for digital competence in higher education. *Journal of Digital Learning in Teacher Education*, 35(4), 1-18. <https://doi.org/10.1080/21532974.2019.1646169>
- Anwar, M., Khan, A., & Sultan, K. (2020). The barriers and challenges faced by students in online education during the COVID-19 pandemic in Pakistan. *Gomal University Journal of Research [Online]*. <https://link.gale.com/apps/doc/A629071842/AONE?u=anon~e963527c&sid=googleScholar&xid=3b1c0528>
- Bayrakdar, S., & Guveli, A. (2020). *Inequalities in home learning and schools' provision of distance teaching during school closure of COVID-19 lockdown in the UK*. Working Paper. ISER Working Paper series.
- Cooper, R., Farah, A., & Mrstik, S. (2020). Preparing teacher candidates to teach online: A case study of one college's design and implementation plan. *International Journal on E-Learning*, 19(2), 125-137.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage Publications, Inc.
- Häkkinen, J., Karhu, M., Kalving, M., & Colley, A. (2020). Practical family challenges of remote schooling during the COVID-19 pandemic in Finland. [Conference presentation abstract]. NordiCHI '20 Conference. <http://doi.org/10.1145/3419249.3420155>
- Janssen, M., & Wiederhorn, T. (2020). School adoption in teacher education: Increasing pre-service teachers' responsibility during Practice. 9-14.
- Li, C., & Lalani, F. (2020). "The COVID-19 pandemic has changed education forever. This is how." World Economic Forum. <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-onlinedigital-learning>
- Merriam, S. B. (2013). *Qualitative Research: A Guide to Design and Implementation*. John Wiley & Sons.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.
- MoNE [Ministry of National Education in Turkey]. (2020a). EBA içeriklerine ücretsiz erişim, Turkcell ve Vodafone'da 6 GB'a, Türk Telekom'da 8 GB'a yükseldi! [Free access to EBA content increased to 6 GB in Turkcell and Vodafone, and 8 GB in Türk Telekom!]. <https://www.eba.gov.tr/3gb>
- MoNE [Ministry of National Education in Turkey]. (2020b). Uzaktan eğitim 31 mayısa kadar devam edecek. [Distance education will continue until May 31]. <http://www.meb.gov.tr/uzaktan-egitim-31-mayisa-kadar-devam-edecek/haber/20803/tr>
- MoNE [Ministry of National Education in Turkey]. (2020c). *Uzaktan eğitim Bakan Selçuk'un verdiği dersle başladı* [Distance education started with the lesson on Education Minister Selçuk]. <http://www.meb.gov.tr/uzaktan-egitim-bakan-selcukun-verdigi-dersle-basladi/haber/20578/tr>
- MoNE [Ministry of National Education in Turkey]. (2020d). *18 eylüle kadar sürecek uzaktan eğitim döneminin yol haritası* [Road map of distance education which will continue until 18th of September]. <https://www.meb.gov.tr/18-eylule-kadar-surecek-uzaktan-egitim-doneminin-yol-haritasi/haber/21499/tr>
- MoNE [Ministry of National Education in Turkey]. (2021a). *EBA TV ilkokul, ortaokul ve lise kanalları* [EBA TV primary school, middle school and high school channels]. <http://eba.gov.tr/>
- MoNE [Ministry of National Education in Turkey]. (2021b). *Uzaktan eğitim sürecinde destek alternatiflerimizle tüm öğrencilerimizin yanındayız* [We are with all our students with our support alternatives in distance education process]. <http://www.meb.gov.tr/uzaktan-egitim-surecinde-destek-alternatiflerimizle-tum-ogrencilerimizin-yanindayiz/haber/22355/tr>
- MoNE [Ministry of National Education in Turkey]. (2021c). *Edusimsteam Project*. MoNE: Ankara, Turkey. http://edusimsteam.eba.gov.tr/?page_id=95&lang=en
- MoNE [Ministry of National Education in Turkey]. (2021d). *Scientix Project*. MoNE: Ankara, Turkey. <https://scientix.eba.gov.tr/>

- Saralar, İ., Işıksal-Bostan, M., & Akyüz, D. (2018). The evaluation of a pre-service mathematics teacher's TPACK: A case of 3D shapes with GeoGebra. *International Journal for Technology in Mathematics Education*, 25(2), 3-22. http://doi.org/10.1564/tme_v25.2.01
- Saralar-Aras, İ., & Güneş, H. (2022). Pre-service primary and maths teachers' readiness for distance education. *Educational Theory and Practice*, 12(1), 195-220. <https://doi.org/10.17943/etku.992514>
- Sarı, M. H., & Akbaba-Altun S. (2015). A qualitative research on classroom teachers' technology use in mathematics teaching. *International Journal of Eurasia Social Sciences*, 19(1), 24-29.
- Sarı, M. H., & Keser, H. (2021). Classroom teachers' online teaching experiences during the COVID-19 pandemic: The perspective of technological pedagogical content knowledge. *Journal of Pedagogical Research*, 5(4), 251-269. <https://doi.org/10.33902/JPR.2021474706>
- Schleicher, A. (2020). *The impact of COVID-19 on education - insights from education at a glance 2020*. <https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf>
- Sepulveda-Escobar, P., & Morrison, A. (2020). Online teaching placement during the COVID-19 pandemic in Chile: challenges and opportunities. *European Journal of Teacher Education*, 43(4), 587-607. <http://doi.org/10.1080/02619768.2020.1820981>
- Spoel, I., Noroozi, O., Schuurink, E., & Ginkel, S. (2020). Teachers' online teaching expectations and experiences during the Covid19-pandemic in the Netherlands. *European Journal of Teacher Education*, 43(4), 623-638. <http://doi.org/10.1080/02619768.2020.1821185>
- Sykes, D. (2020). Online education during a pandemic: Teaching and learning in home spaces. *Literacies and Language Education: Research and Practice, Special Issue*, 86-88.
- UNICEF. (2020a). Education and Covid-19: Monitoring the situation of children and women. <https://data.unicef.org/topic/education/covid-19/>
- United Nations Children's Fund and International Telecommunication Union (UNICEF) (2020b). How many children and young people have internet access at home? Estimating digital connectivity during the COVID-19 pandemic. <https://www.unicef.org/reports/how-many-children-and-young-people-have-internet-access-home-2020>
- United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2020a). *Education during COVID-19 and beyond*. Policy Brief. <https://unsdg.un.org/resources/policy-brief-education-during-covid-19-and-beyond>
- United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2020b). *How are you learning during the Covid-19 pandemic?* Global Education Coalition.
- Wan, Y. S. (2020). *Education during Covid-19*. Ideas Institute for Democracy and Economic Affairs Report.
- World Health Organization (WHO) (2020). Naming the coronavirus disease (COVID-19) and the virus that causes it. [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it)
- Yıldırım A., & Şimşek H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences]* (9th Edition). Seçkin.
- Yin R. K. (2014). *Case study research: Design and methods* (5th ed.). Sage.
- Yu, J. (2020). Covid-19 and the challenges of remote teaching in China. <https://blog.cambridgeinternational.org/covid-19-and-the-challenges-of-remote-teaching-in-china/>