EMERGENCY REMOTE EDUCATION AFTER COVID-19 IN EUROPEAN COUNTRIES: SCIENCE TEACHERS' VIEWS

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Abstract

This study explores the perspectives of European science teachers on emergency remote education after the Covid-19 pandemic. School closures in 2020 led to a rapid shift to distance learning, making it crucial to understand teachers' experiences, challenges, and satisfaction. Using a qualitative case study approach, the research focused on science teachers' experiences during the pandemic and their interpretations of those experiences. Semi-structured interviews with nine teachers from various European countries explored aspects like difficulties faced, student interaction, technology infrastructure, motivation, and assessment. Despite challenges, the study found that some teachers saw advantages in distance education, including increased student motivation, improved technology skills, and flexible learning environments. These findings, from just nine teachers, suggest distance education could become a permanent feature, informing future decisions about success factors and educational system development. It is also recommended that the study be replicated in different regions.

Key Words: Open and distance education, emergency remote education, case study, qualitative method, distance science teaching.

Özet

Bu çalışma, Covid-19 salgını sonrasında Avrupa'da görev yapan fen bilimleri öğretmenlerinin acil uzaktan eğitime bakış açılarını ortaya koyan bir araştırmadır. 2020'de okulların kapanması, uzaktan eğitime hızlı bir geçişe yol açmış ve bu da öğretmenlerin deneyimlerini, karşılaştıkları zorlukları ve memnuniyetlerini anlamayı çok önemli hale getirmektedir. Niteliksel yöntemin bir durum çalışması yaklaşımı ile desenlenen araştırma, fen bilimleri öğretmenlerinin pandemi sırasındaki deneyimlerine ve bu deneyimlere ilişkin yorumlarına odaklanmaktadır. Çeşitli Avrupa ülkelerinden dokuz öğretmenle yapılan yarı yapılandırılmış görüşmelerde karşılaşılan zorluklar, öğrenci etkileşimi, teknoloji altyapısı, motivasyon ve değerlendirme gibi konular ele alınmaktadır. Zorluklara rağmen, çalışma bazı öğretmenlerin uzaktan eğitimde artan öğrenci motivasyonu, gelişmiş teknoloji becerileri ve esnek öğrenme ortamları gibi avantajlar gördüğünü ortaya koymaktadır. Çalışma kapsamında dokuz öğretmenden elde edilen bu bulgular, uzaktan eğitimin kalıcı bir özellik haline gelebileceğini, başarı faktörleri ve eğitim sistemi gelişimi hakkında gelecekteki kararları bilgilendirebileceğini göstermektedir. Çalışmanın farklı bölgelerde ve farklı çalışma gruplarıya tekrarlanması da tavsiye edilmektedir.

Key Words: Açık ve uzaktan eğitim, acil uzaktan eğitim, durum çalışması, nitel yöntem, uzaktan fen öğretimi

INTRODUCTION

Education cannot be defined by a single formula, as its impact is felt across various domains (Morse, 1995: 5). In recent years, with the rapid development of innovation and technology, the education process has also been changing. While news and information about distance education are being discussed, many institutions providing education at the K12 level have not been able to provide face-to-face education for almost two years due to the Covid 19, which started worldwide in 2020 and was described as a pandemic by the World Health Organization (WHO). In the 21st century, with many technological tools, equipment and digital structures, humanity, which sees and defines itself at a very advanced level in terms of technological development, has been massively helpless in the face of the epidemic declared as the Covid-19 pandemic. (WHO, 2020). In order to keep the effects of the epidemic under control, many countries have tried to take unprecedentedly strict measures, and many important activities in economic, educational and social fields have been disrupted (Sezgin, 2021). In addition, it is possible to say that people's daily life routines have changed dramatically during this process. The concept of "new normal", which we encounter in the process, is used to explain and internalize this new order and depicts some mandatory behavioral changes.

With the beginning of the pandemic process, many schools, universities and educational institutions closed their doors indefinitely, and approximately one and a half billion students from all age groups around the world switched from face-to-face education to distance education activities (UNESCO, 2020a; UNICEF, 2020b). This educational response, known as emergency distance education, quickly addressed the negative impact of the pandemic on education. During the Covid-19 pandemic, technology played a crucial role in ensuring that communication and education could continue uninterrupted, and the process of emergency distance education gained significant prominence K12, where schools suspended face-to-face education. Emergency distance education has unexpectedly entered our lives and forced the education process to adapt to a new system. The Covid-19 pandemic is seen as one of the most important factors in the rapid construction and implementation of this new system. In this context, it is thought that teachers' opinions regarding the emergency distance education implemented in K12 during the Covid-19 pandemic period are necessary to identify the positive/negative aspects seen in the current practice and to determine the improvements to be made).

LITERATURE

Distance education is defined as an education method in which the learning and teaching process is planned for individuals at different distances through technologies (Moore & Kearsley, 2005: 2). Distance education can be defined as education that does not require students to be physically together in a place and takes place in a planned and programmed manner (Kırkan & Kalelioğlu, 2017). When the Turkish education system is examined, it is seen that distance education started in the 1950s (Kırık, 2014: 83). However, there are significant differences between the concept of distance education in that period and today. There have been significant changes in the educational environment, methods, and tools used since then.

In the literature, the concept of emergency distance education, which is used to characterize the sudden and unpredictable but necessary structural change from face-to-face classroom courses to online education format, has gained prominence (Linnes, Ronzoni, Agrusa & Lema, 2022). Emergency distance education refers to the temporary use of alternative delivery modes due to crisis situations, and is distinct from planned and designed online education and training processes. (İşte Teknoloji, 2020). Emergency distance education is a model of education that provides secure access to materials during its implementation, unlike traditional distance education which is planned in advance. (Bozkurt & Sharma, 2020). In short, emergency distance education, unlike well-planned online learning, can be expressed as an education method that takes place to continue face-to-face teaching that cannot be sustained in a crisis (Ramazanoğlu & Uluyol, 2023).

It is said that educational institutions and stakeholders in many countries were caught managerially, technologically and pedagogically unprepared for the crisis environment that came with Covid-19, since they had not encountered a similar situation before (Sezgin, 2021). During Covid-19, distance education has unexpectedly become a common method at all levels of education. Due to the sudden implementation of distance education, though the process was managed quickly, it is crucial to evaluate science teachers' opinions of the course environment and the situation of students.

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In the literature review, it is seen that many studies have been conducted on distance education during the Covid-19 period (Mae-Toquero, 2021; Sezgin, 2021; Koç & Bavlı, 2022; Saroglou & Kostas, 2023; Kıymet & Çakır, 2023; Öz, Aydemir & Erdamar, 2023). In these studies, studies on emergency distance education and distance education were examined. It has been observed that some studies include the opinions of students, and there are also studies that focus on the opinions of educators. It is understood that in these studies, discussions were held on the limitations and benefits of distance education, covering all educators, from classroom teachers to university faculty members (Altınpulluk, 2021; Bakioğlu & Çevik, 2020; Canpolat and Yıldırım, 2021; Özdoğan and Berkant, 2020; Türker and Dündar, 2020; Yolcu, 2020; Yurtbakan and Akyıldız, 2020). For example, in an interview with a group of teachers, it was emphasized that the content and materials should be enriched and developed, and solution suggestions were offered (Bayburtlu, 2020). In Kıymet & Çakır's (2023) research, which stated that teachers had problems using digital technologies, it was stated that lessons conducted via distance education during the Covid-19 pandemic period provided independence from time and place, but caused difficulties in classroom management and inequality of opportunities.

Within the scope of this study, various discussions about distance education were held with science teachers working in schools in different countries such as Croatia, Spain, Portugal and Jordan. This research reflects the state of distance education in K-12 schools during the pandemic period. It was conducted through direct interviews with teachers who taught during the distance education process.

Purpose of the Research

The main purpose of this study is to determine the science teaching lessons taught by science teachers working in different countries during the Covid-19 pandemic period and their views on this process. The research examines science teachers' perspectives on distance education during the pandemic and the technologies they actively use in their lessons. In this regard, answers were sought to the following questions:

1. What are the problems experienced by science teachers during the education and training processes related to distance science courses during the Covid-19 pandemic?

2. What are the positive opinions of science teachers about the education and training processes regarding distance science courses during the Covid-19 pandemic?

What are the recommendations of science teachers working in schools during the Covid-19 pandemic process for the distance education process?

METHOD

Research Model/Design

This research was conducted in the case study model, which is a design of the qualitative method. The case study is a research approach based on limiting a problem to one or more case studies and researching these case studies (Creswell, 2007). In case studies, a qualitative design is used in which information is collected over a certain period of time and is limited to various information sources such as interviews and observation reports (Creswell and Poth, 2016). This pattern focuses on individuals' experiences and the meanings they give to these experiences (Creswell, 2007). In this study, we focused on teachers' experiences during the pandemic process and the meanings they gave to their observations during the process. The study was limited to science teachers who conduct distance education in digital environments.

Data Collection Tools

In this study, a semi-structured interview form was prepared by the researchers. Data was collected using the interview form. Since the participants were located in different cities and countries, the interviews were held via teleconference. Participants in the study were informed that their answers would be used only for scientific purposes and that their information would be kept confidential. Participants were given code names such as S1, S2 for confidentiality reasons. English, the global common language, was used in the voice-recorded interviews, and each interview lasted approximately ten to twenty minutes.

The interview questions were developed by the researchers and consisted of three open-ended questions. To ensure the internal validity of the interview questions, they were examined by experts in the field of education

programs and training, distance education and science, and the questions were given their final form. The research data collection tool was created using Google Forms and shared with participants through the same platform. Personal information of the participants, such as the country they attended, their branch, the online platforms they used during the distance education process and the adaptation process were also asked through Google Forms. The obtained data was stored in Excel format and made ready for analysis.

Study Group

The study group for this research is comprised of nine science teachers who were selected using the criterion sampling method. The teachers were chosen from those who taught distance education in different countries during the 2020-2022 academic years after March 2020, as shown in Table 1. In criterion sampling, the basis is to study situations that meet a set of predetermined criteria (Baltacı, 2018). Participants were selected from countries registered on the portal where one of the researchers had previously run eTwinning projects. Teachers who teach science to students aged 12-15 and actively participate in distance education courses were selected based on the categories in the eTwinning platform. Teachers working in different countries and schools were preferred to ensure diversity in the research group. In short, when determining the group, criteria such *as teachers' active participation in emergency distance education courses, volunteering, being registered on the eTwinning portal, working in different countries, conducting science-related courses and obtaining data suitable for the purpose of the research* were taken into account. Written and verbal consent was also obtained from the teachers stating that they volunteered to participate in the research.
Details about the study group are shown in Table 1.

Table 1. Demographic Characteristics of the Teachers Participating in the Research

Feature	Category	Number
Country of Work	Croatia	1
	France	1
	Greece	1
	Italy	1
	Jordan	1
	Poland	1
	Spain	1
	Turkiye	1
	Romania	1
Gender	Female	9
	Male	0
Did she teach via distance education?	Yes	9
	No	0
Branch	Physics	2
	Chemistry	4
	Biology	1
	Science	2
Type of institution worked for	Secondary school	2
	High school	7

Data Analysis

The teachers' responses to the research questions were analyzed using content analysis to obtain data suitable for the purpose of the research. The data obtained was defined and presented in a clear way for readers to understand easily (Yıldırım & Şimşek, 2013). The notes taken by transcribing the audio recording were completely stored in a computer environment and a data set of approximately 6 pages belonging to 9 teachers was created. The collected responses were categorized according to common views.

Validity and Reliability

Validity and reliability in qualitative research are expressed with consistency and determination. In this research, the fact that the participants had different opinions and their direct opinions were taken shows the credibility of the research. Determining the questions carefully, clearly expressing the method, data collection and analysis process, and performing independent analyses support consistency (Yıldırım & Şimşek, 2013).

After the data coding process was carried out by the researchers, the researchers came together, compared the analyses they had made, and determined the items of consensus and disagreement. The reliability formula suggested by Miles and Huberman (1994: 64) was used to calculate the reliability of the research. If the result calculated with the reliability formula is over 70% (Miles and Huberman, 1994: 64), it is accepted that inter-rater reliability has been achieved. As a result of the calculations made in this research, the reliability of the research was found to be 94% and the research was considered reliable.

Limitations

The study was limited to teachers who teach science courses, which cover abstract concepts such as changes in matter, force and motion. Science education also includes practical content and experimentation processes. In addition, one of the researchers conducted science-related courses and projects at the K12 level during the pandemic. The study is also restricted to science teachers in Croatia, France, Spain, Greece, Italy, Greece, Italy, Turkey, Poland, who came together as part of a project.

FINDINGS AND DISCUSSIONS

Findings Regarding The Problems Experienced By Science Teachers During The Education And Training Processes Related To Distance Science Courses During The Covid-19 Pandemic.

The problems experienced and observed by science teachers working in schools during the distance education process during the Covid-19 global pandemic are thematized. These themes and the relevant teachers' responses are included in Table 2.

Table 2. Problems Experienced by Teachers Regarding Distance Science Education

Themes	Participants
1) Technical/Technological Problems	S1, S2, S3, S4, S5, S6, S7, S8
2) Problems Related to the Learning Process	S3, S4, S8
3) Low Motivation Problem	S3, S5, S6, S7
4) Process Evaluation Problem	S1, S2, S5, S9
5) Attendance-Absence Status	S1, S2, S4, S9

Teachers' opinions regarding the "Technological Problems" theme are as follows:

S4: "Teachers did their best to solve technical problems. However, unfortunately, some students did not attend classes or stated that they encountered computer and internet problems."

S5: "We experienced internet connectivity issues during lessons, resulting in disruptions."

S7: "There were technical problems (microphone problem, connection problem) and the problem of not being able to fully recognize the students."

S8: "There were technical issues that prevented the students from fully participating in the lesson. Students simply logged in and attended the lesson with their textbook answer keys."

Teachers' opinions regarding the theme "Problems Related to the Learning Process" are as follows:

S3: "There were some students who were attempting to engage in the lesson despite the presence of a loud and distracting environment. Some students were deliberately trying to disrupt the lessons. For this reason, sometimes I did not permit these students to speak. In this case, it became difficult to understand whether they listened to the lesson or not."

S4: "Most of the students were attending the lesson silently and without video since there was no obligation to turn on the camera. However, when we called out to the students, we did not get any response. "This situation made our job very difficult."

S8: "Students do not participate in the lesson as willingly and enthusiastically as they do in the classroom. Back and waist pain due to constantly being in front of the screen and eye fatigue due to looking at the screen. The requirement for two teachers to attend classes at the same time in the same house and restrictions on the use of technological devices. Limitation of one-to-one communication with students with learning disabilities. "It is more difficult for students to focus on the lesson while using a screen."

Teachers' opinions regarding the theme of "Low Motivation Problem" are as follows:

S3: "We felt great anxiety and fear, especially for students whose relatives had Covid-19. Some students' parents were healthcare workers and these students experienced fear as their parents went to work. They shared their stress with us in classes. This fear negatively affected their interest and motivation in classes."

S5: "Some students stated that they did not understand anything from distance education. So I asked them how I could teach the lesson more effectively. However, they persistently said that they could not learn with this method and that the lessons were inefficient. However, I was teaching the lessons with the same tone of voice and even using more materials."

S6: "Continuously teaching with the same students was decreasing both their and my motivation. The number of students attending the lesson was not more than five. In fact, in some classes, no one spoke up. "I felt very unhappy, especially while teaching in these classes."

S7: "The students who struggle with technology in distance education often lose motivation, hindering the learning process."

Teachers' opinions regarding the theme of "Process Evaluation Problem" are as follows:

S1: "We usually gave homework via EBA, but some students persistently wanted me to send it via WhatsApp. It was very difficult to keep track of assignments on two different platforms."

S2: "Since I was only able to attend two classes per week, I had too many classes and it was taking me hours to keep track of the assignments. "I could detect students who were not doing their homework, but I could not force them to do it."

S5: "I saw that even the students who were not successful in classes were doing their homework well. I knew their families were helping or they were finding answers from other sources. But it was difficult for us to prove it."

S9: "Since distance education is seen as transferring the course taught in the classroom to an online environment, classroom management and assessment and evaluation processes were disrupted. "This resulted in a higher number of students leaving the classroom compared to those in formal education."

Teachers' opinions regarding the theme of "Attendance-Absence Situation" are as follows:

S1: "We were in constant communication with the parents. Sometimes parents would call to complain about their children. I would try to explain to these students one by one how it would be beneficial for them to attend the lessons. Although it was effective for a few weeks, some students stopped attending the lessons altogether."

S2: "I learned that some students work with their families or elsewhere. "The students' families also supported his decision of not attending the class." Unfortunately, we could not do anything for such students."

S4: "I noticed that even some students who were successful in face-to-face education neglected classes. When I asked the reason, I usually received evasive answers. Some students stated that there were not enough tablets or smartphones at home. However, by talking to the classroom teachers, I learned that these students did not have financial problems. So some students were not attending classes simply because they did not want to."

S9: "Not all students actively participated in the lesson. "I don't think even the students who participated focused on the lesson effectively."

Findings Regarding The Positive Opinions Of Science Teachers About The-Education And Training Processes Regarding The Distance Science Course During The Covid-19 Period

In line with the positive opinions that science teachers experienced and observed during the distance education process during and before the Covid-19 pandemic period, the themes that form the basis of these opinions are presented in Table 3 along with the teachers' answers.

Table 3. Positive opinions of Science Teachers about distance education

Themes	Participants
1) Students' interest and participation	S3, S5, S7, S9
2) The openness and flexibility provided by distance education	S1, S2, S3, S4, S5, S6, S8,
3) Offering teachers a comfort zone/reducing workload	S1, S2, S3, S4, S6
4) Contributing to technology usage skills	S1, S2, S3, S4, S5, S7, S8

The opinions of the participants regarding the theme of "Students' Interest and Participation" are as follows:

S3: "Although we stated that attendance at classes was mandatory during the distance education process, students who attended classes regularly were generally willing. Since the student's willingness makes the lessons more enjoyable, I supported the lessons by using more activities and videos. Additionally, I gave small prizes to increase students' motivation. "Students attended the next lesson more willingly because they enjoyed it and saw success."

S5: "I observed that especially students who cannot express themselves comfortably in classrooms are more comfortable in distance education."

S7: "Our successful students started to feel great anxiety during this process. "They were wondering what to expect and whether the lessons would be productive." As a result, the launch of distance education somewhat eased their worries."

S9: "Classrooms are much quieter in distance education. This gives students the opportunity to easily express both what they know and what they do not know. "As both we and the parents appreciate the students who attend the class, the interest and enthusiasm of the students increases."

Teachers' opinions regarding the theme of "openness and flexibility provided by distance education" are as follows:

S1: "Especially presenting the courses on EBA TV made the job easier for both us teachers and students. It was a nice opportunity for students to access information later, even if not that day."

S2: "We prepared worksheets and shared them via WhatsApp with the students who could not attend classes. We provided flexibility by giving certain periods of time. "It made the students feel relaxed."

S3: "All teachers came together and made contributions during the distance education process. "Students had the opportunity to listen to the same subject from different teachers at different times and places."

S4: "Distance education is widely used around the world. Our secondary school students were also able to be aware of this flexibility during the pandemic period."

S5: "I think hybrid teaching will continue despite the end of the pandemic. "It is crucial that students who are ill or face other issues can participate in distance learning classes."

S6: "Since today's students aim to learn by doing and experiencing, it is important to provide flexibility in time and place."

S8: "It has advantages in terms of time and money, reducing the time it takes to go to school, providing the opportunity to access the desired education at any time due to the lack of distances, offering the convenience of listening to lessons again and offering time flexibility."

The opinions of the participants regarding the theme of "Alleviating the teacher's workload/providing a comfort area" are as follows:

S1: "I observed some students preparing and attending classes via EBA TV. This reduced my workload."

S2: "Following up the homework through the system and completing it in just a few minutes made my job much easier."

S3: "Parents' close monitoring of the process and the opportunity to present different contents made the lessons more efficient and made my job easier."

S4: "I noticed that especially students who are difficult to control in the classroom environment remain silent in distance education. This made my job much easier because I could control the students more easily in distance education."

S6: "Being able to continue education and training activities in a comfortable environment without leaving home made my job easier."

Teachers' opinions regarding the theme of "Contributing to technology use skills" are as follows:

S1: "We gained the ability to give and follow assignments given to students via EBA. Students could continue learning outside of class. "That definitely made a big contribution."

S2: "We made use of various studies to make the lessons more efficient. "We learned subjects we did not know and had the opportunity to use them in our lessons."

S3: "The use of technology in lessons increased students' interest and desire in the course. Especially in areas such as oral lessons, we were experiencing situations where just a plain explanation caused distraction. However, during the distance education process, we were able to attract students' attention by accessing materials we had not used before. "This was a great help for us teachers and students."

S4: "We had not used distance education tools before, but during this process, I had the opportunity to get to know them and use them efficiently in lessons. "I think this is helpful."

S5: "The information we had about managing distance education was not sufficient. Therefore, we made a great effort to improve ourselves in this short time. Since we are in the age of technology, I believe that these efforts will benefit us in the future as well."

S7: "My computer use improved during the distance education process. "I was able to have fun lessons with Web 2.0 tools without the classroom crowd."

S8: "Having the ability to use online platforms to teach science has provided great practicality."

Findings Regarding The Suggestions Of Science Teachers Working In Schools During The Covid-19 Pandemic For The Distance Education Process

In the training carried out during the Covid-19 global epidemic, the suggestions of science teachers were themed according to their distance education experiences and observations. These themes and teachers' responses are seen in Table 4 below.

Table 4. Recommendations of Science Teachers for the Distance Education Process

Themes	Participants
1) Technical Infrastructure Support	S1, S2, S3, S4, S5, S6, S9
2) Student Trainings	S2, S3, S7
3) Teacher Trainings	S6, S7, S9
4) Equality of Opportunities	S1, S2, S3, S4, S5, S8

Teachers' opinions regarding the "Technical Infrastructure Support" theme are as follows:

S1: "Many students, particularly those with limited financial resources, faced challenges in accessing the internet. All students should be provided with unlimited internet access for their education."

S2: "Students occasionally got disconnected during the lessons. There were even students who were forgotten in the waiting room. Controlling this situation was taking up a lot of our time. Infrastructure definitely needs to be supported."

S3: "I experienced problems connecting to the system from time to time. When I was able to attend the class, some students were leaving the class because they got bored of waiting. For this reason, I believe that the technical infrastructure should be strengthened."

S4: "Internet disruptions were not supposed to happen. Especially during class hours, the students got disconnected due to the overload in the servers. It is important that students have easy access to the internet and computers."

S5: "There was a loss of attention and time because drops from the system occurred very frequently. Infrastructure needs to be supported."

S6: "We were caught unprepared for this process. However, it is important for future processes to identify infrastructure problems and solve them one by one."

S9: "Free tablets and network connection should be provided. Technical problems that might disrupt the course should be foreseen and precautions should be taken. First of all, the obstacles to all learners' access to technology must be eliminated."

Teachers' opinions regarding the "Student Education" theme are as follows:

S2: Absences did not officially matter, but there were many topics to teach. Particularly in some subjects, such as the nervous system unit, student participation in class was extremely important in terms of meaning. Unfortunately, some students did not choose to listen to us. Both families and students need to be made aware of this issue."

S3: "I remember making phone calls to some students for hours to ensure their class participation. They tell me, "Okay, teacher," but they don't show up for the class again the next day. They didn't understand why we were making so much effort. "I believe it is necessary to explain that education is important under all circumstances."

S7: "Necessary training and orientation studies need to be carried out for students' transition and adaptation from traditional face-to-face education to distance education environments."

The opinions of teachers regarding the theme of "Training of Teachers" are as follows:

S6: "We saw that people in other countries made more progress than us. This process showed that we need to close this gap with them."

S7: "All teachers should receive online and practical training on Distance Education methods and systems instead of specialist training. It is important to encourage pursuing a Master's degree in this particular field.

S9: "Learners should be informed about Web 2.0 tools. The internet infrastructure should be resolved and free internet options should be offered."

Teachers' opinions regarding the theme "Equality of Opportunity" are as follows:

S1: "Students living in rural areas and small towns were either unable to attend classes at all or had very little participation. Solutions should have been found for these students."

S2: "I encountered great difficulties when trying to evaluate students. Every student's home environment may not be suitable for classes. I heard that if there are many students at home, they can take turns attending classes. "This situation made us very sad."

S3: "Some students had difficulty listening to lectures because they could not find a quiet room at home. Some complained that they did not have internet access. In this case, it would not be right to evaluate every student in the same way."

S4: "When we talked to my colleagues working in rural areas, they said that it was unreasonable to force the students because they did not have any tools and equipment to participate in the lessons. "An unexpected situation such as the pandemic has also revealed our shortcomings."

S5: "Lessons were inefficient because students did not have equal opportunities. Every student should have easy access to the internet for their education. This is not only for the Covid-19 process, but also in normal times, the internet is used extensively for education purposes. It is important that every student can benefit from this opportunity."

S8: "In order to achieve equal opportunities, both technological equipment and internet infrastructure should be provided to students who do not have the opportunity. "The concept of distance education must be fully explained and understood by students, parents and society''.

CONCLUSION AND SUGGESTION

The main purpose of this study is to determine the opinions of science teachers from different countries about distance education. A sub-purpose of the research is to determine the positive thoughts of science teachers towards distance education process. The findings provide positive results in terms of distance education being independent of time and place and providing students with technology literacy. Cabı's (2016) study revealed that students were satisfied with being evaluated using digital methods instead of traditional methods. Görgülü-Arı and No-Kanat's (2020) research showed that teachers made progress thanks to online education during the Covid-19 period. Kaplan's (2021) review emphasizes that continuing distance education during the Covid-19 period has many positive aspects and provides participants with time and place flexibility. In this context, the findings in the literature and the results in this study harmoniously support each other.

Another point found positive by the science teachers is the high level of interest and support from parents. In his study, Aydemir (2021) states that communication with parents is easier than with students, depending on age. Atakan (2010) emphasizes in his study that the involvement of parents in the process makes the teacher's job easier. Parents' involvement is a factor that makes the teachers' job easier. In this study, it was stated that the teachers working in the schools where parents valued education were satisfied with the situation.

Science teachers note that another positive aspect of distance education is that it eases the workload. In the studies of Gülbahar (2009) and Burma (2008), it was stated that distance education encourages students to learn individually, students can listen to lectures again, and distance education offers a low-cost education opportunity. This study also shows that students who are difficult to control in face-to-face education can be controlled more easily by the teacher in distance education. This is a factor that makes the teachers' job easier.

The second sub-objective of the research is to determine the problems that science teachers encounter during the distance education process. In this context, the findings show that technical malfunctions are the primary issue. Research shows that many students in Turkey cannot actively participate in the distance education process. Unfortunately, this situation also negatively affects the quality of education (Yılmaz, Güner, Mutlu, Doğanay and Yılmaz, 2020, p. 25). In the literature review, it is noteworthy that many researchers have expressed difficulties regarding the problems related to technological infrastructure. Yılmaz et al. (2020) stated in their study that the majority of students had problems with the internet when attending the course and during the course. This situation seems to reduce the motivation of both teachers and students. Sakarya and Zahal (2020) state that internet connection loss, audio interruption, connection problems or low sound quality prevent the course from being efficient enough.

Another problem identified in the research is lack of motivation. İbicioğlu and Antalyalı (2005) stated in their study that the most important factor that ensures a student's success in distance education is motivation. Sarıtaş and Barutçu (2020) state in their study that students participating in distance education exhibiting a positive approach to lessons increases success in distance education. Teachers who participated in the research also stated that the lack of motivation in their students negatively affected them.

Another problem that emerged in the research is that the assessment and evaluation process is unreliable. Düzakın and Yalçınkaya (2008) stated in their study that academics in Turkey are not good at using technology in video and sound management or course presentations in distance education. However, years have passed and academics, like other people, have managed to use technology more frequently and comfortably in their educational work. However, it has been observed that all teachers have difficulty in assessment and evaluation. At this point, one of the biggest challenges of teachers is to be fair and to take into account the conditions of the students. Additionally, this study reveals that inadequate educational environments and lack of compulsory attendance negatively affect student and teacher motivation.

The third sub-objective of the research is to determine the suggestions of science teachers for the distance education process. One of the results obtained is the necessity of strengthening the technical infrastructure. In their study, Genç and Gümrükçüoğlu (2020) stated that distance education offers many opportunities to students and teachers, but the resulting technical issues cause inequality of opportunity among students. This research reveals that students should be provided with equal opportunities in order to effectively benefit from distance education. It is important to raise awareness of students and provide training to teachers. In their study, Telli and Altun (2020) point out that teachers need to have basic knowledge of MS Office (or similar) applications and basic knowledge of content design in order to prepare course materials for students.

Teachers who participated in the study noticed the problems and deficiencies experienced in the distance education process. They emphasized that it is important to provide various trainings to address these deficiencies. Another finding is that course materials should be fully utilized. Bozkurt and Sharma (2020) emphasized the importance of open resources during the Covid-19 epidemic, and our teachers who participated in the study stated that their unpreparedness for the process caused them not to fully use the course materials.

This study focused on science teachers' experiences, positive opinions, problems and suggestions regarding the distance education process during the Covid-19 pandemic period. Teachers' suggestions are detailed in the findings of the study. This study was conducted to provide suggestions for future research. In addition, it can be investigated how school administrators and teachers can make improvements in order to better plan the distance education process, because there appear to be some delays in the planning of the distance education process.

Overall, the findings of this study suggest that distance education can be an effective way to deliver Science education, but it is important to address the challenges faced by teachers and students. This makes it important to provide teachers with training on how to use technology effectively and ensure that students have access to the resources they need to be successful.

In the light of the study; Some suggestions are offered on how distance education can be improved for science teachers and students. These are:

- Teachers could be trained on how to use technology effectively.
- Students could be provided with access to the resources they need to be successful.
- Students' needs could be taken into consideration when planning distance education and structuring and presenting the emergency distance education process.
- Students could be provided with opportunities to improve their speaking and listening skills during the application process.
- Various teaching methods could be used to keep students interested.
- Students could be provided with feedback on their work

Research and Publication Ethics

In this study, all rules specified in the "Directive on Scientific Research and Publication Ethics of Higher Education Institutions" were followed. None of the actions specified under the second section of the Directive, "Actions Contrary to Scientific Research and Publication Ethics", have been carried out.)

 Disclosure Statements

1. Contribution rate statement of researchers: First author % 50, Second author % 50,
2. No potential conflict of interest was reported by the authors.

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