Journal of Educational Technology & Online Learning
Volume 6 | Issue 2 | 2023
http://dergipark.org.tr/jetol

Online learning and teaching experiences of preservice science teachers during Covid-19 pandemic

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Suggested citation: Tanık Önal, N. & Önal, N. (2023). Online learning and teaching experiences of preservice science teachers during Covid-19 pandemic. *Journal of Educational Technology & Online Learning*, 6(2), 295-314.

Highlights

- The teacher working in the practice school plays a crucial role in the success of the teaching practice course.
- Educators should be equipped with the necessary skills and training to effectively conduct online teaching practices.
- The involvement and support of the school administration are emphasized as vital factors in facilitating a smooth teaching practice experience.
- The role of the university advisor is highlighted as significant in guiding and supporting the pre-service teacher throughout the teaching practice.

Article Info: Research Article

Keywords: *Online teaching, Virtual classrooms, Pre-service teachers, Distance learning*

Abstract

The current study was carried out to determine the opinions of pre-service science teachers on the process of teaching practice conducted online. The study employed the phenomenological design, one of the qualitative research methods. The study was conducted with the participation of a total of 32 (17 female and 15 male) pre-service teachers attending a state university located in the Central Anatolian Region of Turkey in the spring term of the 2020-2021 academic year. The study's data were collected through the online interviews conducted with the participants and the collected data were analyzed using the content analysis method. As a result of the research, it can be stated that they encountered various obstacles in the process of online teaching practice, they had difficulty in providing classroom management and they were anxious. On the other hand, the participants also think that online teaching practice has advantages such as accessing information at the desired place and time, saving time and giving place to different online activities. In the light of these results, suggestions were made such as increasing the knowledge level of educators about online applications, providing hardware support to stakeholders and strengthening the infrastructure.

1. Introduction

Teaching practice courses are conducted in faculties to provide pre-service teachers with practical experience and improve their professional knowledge in the pre-service period. In these courses, pre-service teachers are expected to put the knowledge they have acquired so far into practice. On one hand, pre-service teachers gain different knowledge and skills with the new situations and problems they encounter during the teaching practice process. In this respect, teaching practice helps to develop and support the teaching competencies of pre-service teachers. Pre-service teachers get to know the curriculum and textbooks related to their field, create a lesson plan, prepare course materials and take a role in the assessment and evaluation process. During this process, pre-service teachers may have their first encounter with their target audience and gain their first experience in classroom management. In summary, teaching practice is a very important course for the professional development of pre-service teachers (Barnes, 2010). Haydn and Barton (2007) also emphasize a similar point and suggest that pre-service teachers should focus on practical training rather

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Doi: http://doi.org/10.31681/jetol.1078486
Received 24 Feb 2022; Revised 22 May 2023; Accepted 24 May 2023
ISSN: 2618-6586 .

than theoretical knowledge and increase the effectiveness of the teaching practice process. This course is practically important in a practice-oriented fields such as science. For instance, conducting experiments and managing the classroom during these experiments are competencies that can be developed through experience. Due to its importance, teaching practice is included as two courses in the seventh and eighth semesters as Teaching Practice I and II respectively in the undergraduate programs of the education faculty.

In order to carry out the teaching practice courses effectively and efficiently, the cooperation of the teacher working at one of the practice schools affiliated with the Ministry of National Education, the pre-service teacher, the school administration, and the university advisor is required. Teaching practice is a practical course that is typically conducted in schools and classrooms, providing pre-service teachers with hands-on experience in a collaborative environment through face-to-face education. However, the Covid-19 pandemic, which started at the end of 2019 and affected the whole world in a short time, turned the normal conditions upside down and led to the emergence of new applications. In order to stop the progress of the pandemic and protect the health of individuals, distance education was initiated with the understanding of using digital technologies at all levels of education from primary school to higher education (Angoletto & Queiroz, 2020; Sahu, 2020). In this process, distance education in Turkey was carried out in two ways: The online education platform called Educational Informatics Network (EBA) and Educational Informatics Network TV (EBA TV). EBA serves in three different channels: EBA Primary School, EBA Middle School and EBA High School. In these channels, a program was prepared for each grade level and these programs were shared with students. As part of these programs, pre-recorded lectures were broadcast on channels throughout the day. Broadcast parts of the lectures were shown again and again during the day. This was a great advantage for students who wanted to revise the lesson or could not watch it. These channels also included "Activity Time", which offered different content that entertained and educated students between lessons.

During the pandemic, distance education was also implemented at universities. Each university conducted its courses synchronously or asynchronously depending on its infrastructure. Therefore, the teaching practice course was also carried out through distance education during the pandemic. In this process, pre-service teachers met with their students on the online platforms and conducted various activities. However, pre-service teachers encountered important problems. This educational practice, which had never been experienced before by pre-service teachers, mentors, advisors and students, emerged unexpectedly. Pandemic process full of ambiguities led to an educational practice full of unknowns and it was inevitable that the psychology of pre-service teachers would be affected by this (Özok, 2020). Moreover, even if it is in the form of face-to-face education, it is possible for pre-service teachers to have some difficulties in this process of their first teaching experience. The process of serving as a pre-service teacher is an emotionally and individually difficult experience (Koemer, O'Connell-Rust & Baumagartner, 2002). It is stated that teaching practice is a complex experience for pre-service teachers (Bloomfield, 2010).

Literature

In this process, somebody believed that the only problem was that the courses were conducted through distance education. This is where teacher beliefs come into play. Practitioners' perspectives of the system will inevitably affect the educational practices they will carry out, and thus the effective and efficient conduct of the process. Despite this environment of ambiguity, the distance education process actually played a role as an intermediary to ensure the development of pre-service teachers' technological pedagogical content knowledge. Similarly, Daniel (2020) also emphasized that this pandemic is an opportunity for the education system to expand into different domains other than face-to-face education. It is very important that the teachers of the new generation, who grow up in a world of technology, are qualified to meet the needs of this generation. In fact, in the standards published as effective teacher characteristics by the International Society for Technology in Education (ISTE), it is stated that teachers should create a learning environment enhanced with the integration of technology into education and develop students' skills such as creativity and innovative thinking by using both face-to-face and online

environments (ISTE, 2008). In addition, it seems clear that when the pandemic is even over, distance education applications will continue at least with hybrid models in the future. However, to achive this, the opinions of teachers (and correspondingly, the pre-service teachers) about the process should be first investigated. Otherwise, any paradigm shift will not be reflected successfully (Mulenga & Marban, 2020). From this perspective, it is very important to investigate the experiences of pre-service teachers who have been exposed to this practice, to determine their opinions and to evaluate the system according to their opinions. In a way, this involves conducting a needs analysis. According to the findings to be obtained here, it may be possible to improve the practice. In addition, what is expected from teachers is their being open to change and development and being able to easily adapt to innovations. Thus, with such a research, new opportunities can be offered to pre-service teachers by understanding their attitudes and behaviours towards innovations and considering what can be done for them in the pre-service period. On the other hand, it is thought that conducting this research based on the opinions of pre-service science teachers is a special importance.

When the literature is reviewed, it is seen that some studies have been carried out on the evaluation of distance education during the pandemic (Bakioğlu & Çevik, 2020; Pıştav Akmeşe & Kayhan, 2021; Gökbulut, 2021; Gök Çolak & Efeoğlu, 2021). However, no study has been found in which the views of pre-service teachers, who are the subject of the current study, about online teaching practice are examined in a similar framework. For this reason, it can be stated that the current study is original and valuable. The most important focus of the subject-area educators is to ensure that the subject area knowledge of pre-service teachers is strong, regardless of the educational approach (face-to-face, distance or hybrid). To accomplish this, it is necessary to strengthen teacher education. A study conducted by Karataş Aydın (2023) with pre-service teachers revealed that the participants perceived online learning as more effective than videos and presentations, and recommended that education faculty programs should be revised to incorporate hybrid learning The current study is also important in this respect. These online teaching practice experiences of pre-service teachers are a factor that can affect their self-efficacy. Bandura (1971) states that individuals' behaviours are affected by their past experiences, and therefore their self-efficacy beliefs differentiate. Finally, from the perspective of online learning, it is believed that the results of this research will contribute to the relevant literature. Because although there are common difficulties or problems encountered in online learning, it also has superior aspects in some themes determined as flexibility, accessibility, pedagogical innovation and self-regulation in the execution of the tasks that need to be done (Lucas & Vicente, 2022). For this reason, it would be a hit to strengthen online learning rather than avoiding online learning applications. Based on the results of this research, it is considered important in this respect as well.

Based on all the reasons mentioned above, this study was carried out to determine the opinions of pre-service science teachers about online teaching practice. The questions guiding the study are as follows:

- ✓ What are participants' experiences of the about the problems encountered in the process of online teaching practice?
- ✓ What are participants' experiences of suggestions for solutions to the problems encountered in the online teaching practice process?
- ✓ What are participants' experiences of advantages of online teaching practice compared to face-to-face education?
- ✓ What are participants' experiences of the about the disadvantages of online teaching practice compared to face-to-face education?
- ✓ What are participants' experiences of the about the concerns they felt during the online teaching practice process?
- ✓ What are participants' experiences of the about the classroom management in the online teaching practice process?

- ✓ What are participants' experiences of the about their expectations from the mentor and the advisor in the online teaching practice process?

2. Methodology

In this study, it was aimed to reveal the opinions of pre-service science teachers about the online teaching practice process.

2.1. Research Model

The study employed the phenomenological design. Phenomenology is a pattern which aims to understand the experiences of individuals in a multidimensional way (Creswell, 2007). The phenomenological design was preferred because the participants in the current study had knowledge and experience about online teaching practice and it was aimed to reach the essence of their knowledge and experience. In other words, in this study, the online teaching practice perspectives of the participants were tried to be explained with interpretive philosophy.

2.2. Data Collection Tools

The main data collection tool in the phenomenology design is the interviews with the participants (Creswell, 2007). The data of the study were collected through semi-structured interviews conducted with the participants. Before the interviews, an interview form containing 10 open-ended items was prepared by the researchers. Care was taken to ensure that the questions in the form were aligned with the research questions. Then, the developed form was submitted to the review of two field experts having a Ph.D. degree and research on distance education. The data collection process was started after receiving the approval of the experts. Some of the items in the interview form are as follows:

1. Can you evaluate the online teaching practice process? Can you explain why you think so?

2. What are the advantages of the online teaching practice when you compare it to face-to-face education? Why do you think so?

3. What are the disadvantages of the online teaching practice when you compare it with face-to-face education? Why do you think so?

2.3. Study Group

The study group consisted of the fourth-year students attending the Science Teaching Department of a state university located in the Central Anatolian Region. While determining the participants, criterion sampling, one of the purposive sampling methods, was used. The following criteria were used in the selection of the participants; pre-service science teachers' attending the teaching practice lessons and their willingness to participate in the study. A total of 32 (17 female and 15 male) pre-service teachers participated in the study. The mean age of the participants is 21.

2.4. Data Analysis

Before the interviews, the participants were informed about the purpose of the study and it was stated that the ethical rules would be followed in the study, that the data obtained would only be used for scientific purposes and that personal information would not be shared. Interviews were held on the MS Teams platform on the days and times that were suitable for the participants. With the consent of the participants, the interviews were recorded in order to prevent data loss. During the interviews, the researcher was careful not to direct the participants and to conduct the interview in a conversational style. Each interview lasted an average of 30 minutes. The data collection process was completed in a two-month period. Following the completion of the interviews, the recorded interviews were transcribed and a MS Word document was obtained. The documents are stored in a digital environment.

Each form was given a number before proceeding to the analysis of the data. Then, each document was read holistically in detail. The data collected in the study were analysed with content analysis. Content analysis was carried out by adopting Creswell's (2008) three-stage approach. During the preliminary exploratory analysis, all data were read twice to gain a holistic view of the data and to get a general idea, and notes were taken on how the data could be organized during the readings. During the coding process, coding was carried out. Following the coding performed one by one, similar codes were grouped and unnecessary codes were discarded. With the completion of the coding, thematic analysis phase was passed. At this stage, themes were created from interrelated codes. In order to finalize the data, the coders came together and firstly discussed the main themes. After reaching consensus on the main themes, the participants under each theme and the number of participants were discussed. As a result, the themes and the people in the themes were determined. In addition, while presenting the data, direct quotations from the views of the participants were given. In the selection of the quotations, criteria such as strikingness, best explanation of the theme, diversity and presentation of extreme examples were taken into consideration (Ünver et al., 2010). The data analysis process is shown in Figure 1.

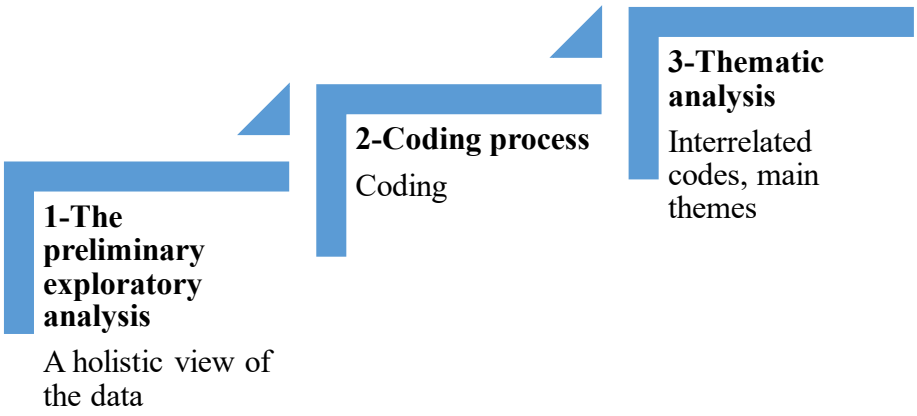

Figure 1. Three-Stage Content Analysis Approach (Creswell, 2008)

2.5. Validity and Reliability

In this qualitative research, various strategies were followed to establish validity and reliability. In this connection, the data collected in the research and the research process were explained in detail in order to establish the validity of the research. In addition, direct quotations from the explanations of the participants are also an important step to establish validity (Yıldırım & Şimşek, 2013). In order to establish the internal validity of the research, the data were analysed independently by two researchers (Merriam, 2013; Yıldırım & Şimşek, 2013). The reliability of the study was calculated as 94% by using the formula proposed by Miles and Huberman (1994). In the literature, it is recommended that the agreement between the codings of the researchers should be at least 80% (Patton, 2002; Yıldırım & Şimşek, 2013). Therefore, it can be stated that the reliability of the research was established.

2.6. Research Procedures

The research data were collected at a time when distance education was available at all levels of education, from primary school to university, due to the pandemic. For this reason, the pre-service teachers conducted their lessons with primary school students through online activities in the form of distance education. In

this process, the faculty members working as the advisors of the pre-service teachers asked the pre-service teachers to plan activities in such a way as to contribute to the accomplishment of objectives set in the curriculum, taking into account the student's level. In this context, the basic content of the online courses conducted by the advisor faculty members with the pre-service teachers is shown in Figure 2:

1. The advisor faculty members held an online meeting with the pre-service teachers and informed them about the process. In this process, the duties and responsibilities of the pre-service teachers were explained to them.
2. Theoretical information about distance education was given to the pre-service teachers. What could be done to make distance education more effective was discussed.
3. The pre-service teachers were informed about technology-supported applications that they could use in their lessons. They were asked to create a lesson plan with these applications in the subsequent process.
4. The pre-service teachers presented their plans to the review of their advisors and mentors in their schools and received their opinions. The plans, which were finalized in this way, were applied to students online.
5. The pre-service teachers submitted their end-of-term e-portfolios.

Figure 2. Basic Steps Followed in the Process of Online Teaching Practice

Applications such as animation, augmented reality, simulation, digital story, interactive worksheets, smart board, Kahoot, Padlet were performed. Some examples from the applications are given in Figure 3.

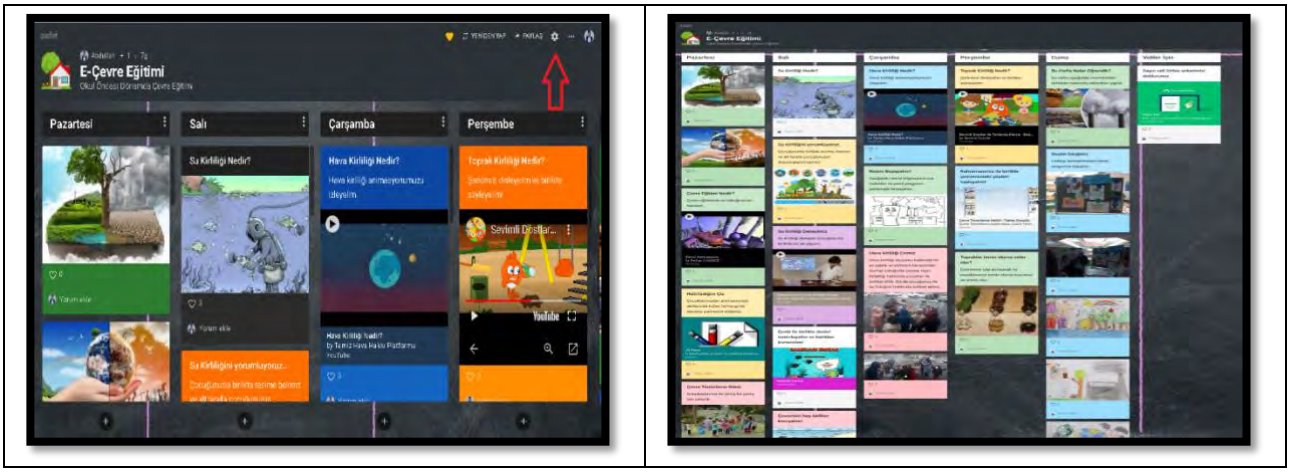

Figure 3. Some examples from the applications

Like every scientific research, there are some limitations of the current study. First, although semi-structured interviews were conducted with a relatively large number of participants in the research methodology, no other data collection tool was used together with it. This may have led to the inability to collect detailed data. For this reason, it will be interesting to make observations and examine the relevant documents in future research to be conducted on the subject. Moreover, the mentor, advisor and pre-service teacher can keep diaries and these diaries can be examined in future research. Furthermore, quantitative data can be collected from a very large sample with a scale or a mixed method research can be conducted.

The application of online education in higher education in Turkey entered the agenda with the measures taken to minimize the risks of the COVID-19 pandemic, which has affected the whole world. Thus, a process called emergency distance education was experienced and due to this urgency, all stakeholders entered a process that they had not been prepared for. Therefore, it would be useful to consider this environment of uncertainty and lack of readiness on the part of stakeholders when evaluating the results of the research.

2.7. The role of the researchers

The researcher has two important roles in this research. The first of these roles is to inform the participants about the purpose of the research and the importance of the participants for this research, and to ensure that the interviews take place in an interview climate where the participants will feel comfortable and safe. Another role of the researcher is the bracketing process called epoche in phenomenological research. In other words, the researchers made an effort to exclude their personal judgments from the research and to rely only on the opinions of the participants during this research process.

In addition, both of the researchers who carried out this research have a certain knowledge and experience about the research topic. It can be argued that this situation has positive reflections in order to manage the research process well.

3. Findings and Discussions

Opinions of the Participants about the Problems Encountered in the Process of Online Teaching Practice

In the current research, in which the views of the pre-service science teachers about the online teaching practice process were examined, the problems that the participants encountered during the online practice process were examined first. Five of the participants stated that they did not encounter any problems. The

findings obtained from the analysis of the data obtained from the responses of the other participants are presented in Table 1:

Table 1.

Problems Encountered in the Online Teaching Practice Process

Category	Code	Frequency	Sample Quotation
Internal Factors	Communication problem	17	K12: "*One of the biggest problems I had was not being able to interact much with the students because we weren't face to face.*"
	Not being able to reflect on the performance	8	K1: *"Unfortunately, I could not do exactly what I wanted to do, I could have explained the lessons I taught more effectively if it had been face-to-face."*
	Not being able to manage the classroom	7	K20: *"In fact, I can say that I encountered many problems. I had a lot of problems, such as the lack of communication with the children, the inability to silence the class and not being able to start the activity, the disruption of the planning of what I was going to do, and the disconnection of the internet from time to time."*
	Not being able to plan	4	K30: *"In the meantime, the audio and video went away. There were problems like this, but I had the most problems because of the inability of planning the lesson. I think this is in the nature of online education."*
	Not being able to involve students in the process	2	K32: *"I have to confess that it was like a one-man show; I talked and students listened. I couldn't involve students much. I would have similar problems in face-to-face education, but they were more intense in distance education."*
External Factors	Access problems	24	K3: *"Reconnecting as the internet is disconnected, the poor access quality of both mine and students', my inability to communicate with students, and lecturing without gestures and mimics are the biggest problems."*
	Interruption of sound	10	K10: *"Sometimes I talked, I talked, no sound went across, sometimes I asked the students a question and they wrote that my voice wasn't heard. That's why the questions and answers were delayed so much."*
	Disappearance of image	3	K15: *"It didn't happen very often, but sometimes when they were experimenting, the students said that the image was gone, which is an important problem for a visual lesson like science."*
	Attention	10	K6: *"Concentrating children's attention on the lesson was very difficult for middle school students."*
	Participation	5	K10: *"Some of the students could not participate actively in the lesson even though they wanted to. Sometimes they didn't connect, sometimes the voice faded away, and thus we lost our concentration."*

When Table 1 is examined, it is seen that the pre-service teachers experienced problems called internal factors originating from the pre-service teachers themselves during the online teaching practice process mostly including problems related to hardware, technical infrastructure and external factors originating from students. The participants mostly gave responses related to internal factors. In other words, problems originating from the pre-service teachers themselves were intense. Again, it can be stated that hardware-related problems were frequently encountered.

Internal factors arose from the fact that the participants could not communicate with students, could not fully reflect on their performance, were unable to manage the classroom, struggled with lesson planning,

and could not involve children in the process. When the answers of the participants are examined in detail, it is understood that they think that all these are due to online education.

The Participants' Suggestions for Solutions to the Problems Encountered in the Online Teaching Practice Process

As the majority of the participants stated that they encountered a problem during the online teaching practice process, they were asked the question "What are the solutions to the problems you encountered?" It should be noted here that the participants were asked about the solutions they would suggest for more qualified online teaching practice, and any suggestion to switch to face-to-face education was not accepted because the aim was to improve the online process. The findings obtained from the responses of the participants are presented in Table 2.

Table 2.

Suggestions for Solutions to the Problems Encountered

Category	Code	Frequency	Sample Quotation
Elimination of Hardware and Infrastructure Problems	Free internet	27	K3: *"In my opinion, free and quality internet support should be offered to both teachers and students free of charge during the pandemic. In fact, this process is not very ineffective, and it is also useful to use it with face-to-face education. If this support is provided."*
	Tablet support	19	K15: *"Tablet support and internet access can be provided for students who have difficulty in following distance education."*
Revision of the Activities	Including attractive activities	17	K6: *"Since children's attention is easily distracted, surprising science experiments and remarkable activities that will be carried out in a short time can be included. In this way, the distraction of children is prevented and the teacher's classroom management becomes easier."*
	Including short and effective activities	10	K17: *"The longer the activities are carried out, the more difficult it is to manage the process, and the students get disconnected. For this reason, effective activities like "science in five minutes" should be done, reducing the time and increasing the quality."*
	Selection of the activities that can be revised by students at home with their parents	4	K12: *"Practice is important in science. For this reason, activities carried out at a distance can be hands on science activities and may be requested to be revised at home with parents."*

When Table 2 is examined, it is seen that the pre-service teachers' suggestions for solutions to the problems encountered during the online teaching practice process are focused on eliminating hardware and infrastructure-related problems and revising the activities. It is quite remarkable that the participants generally offered solutions to eliminate hardware and infrastructure problems encountered in online applications because the participants, who also mentioned the problems stemming from the pre-service teachers themselves in the theme of the problems encountered, did not make any suggestions for the solution of such problems. Accordingly, it can be stated that the participants think that the problems will be solved by eliminating the hardware and infrastructure problems and including more qualified activities that can be carried out in a short time. It is an alarming finding that the pre-service teachers did not make any suggestions to improve themselves.

Opinions of the Participants on the Advantages of Online Teaching Practice Compared to Face-to-Face Education

The participating pre-service science teachers were asked for their opinions on the advantages of online teaching practice. The findings obtained as a result of the analysis of the collected data on the codes in the category of advantages are presented in Table 3.

Table 3.

Advantages of the Online Teaching Practice

Code	Frequency	Sample Quotation
Having Access Whenever and Wherever You Want	25	K31: "*Provision of education under any condition and possibility. The recordings can be watched again whenever we want, which is a huge advantage.*"
Time Saving	17	K3: *"Normally, face-to-face teaching would be very troublesome, time-consuming and tiring, especially for those living in dormitories. However, it was a serious time saving when it was online and this turned into an important advantage when combined with KPSS preparation."*
Online Activities	15	K7: *"Science education is very suitable for technology-based online activities. More concrete materials are used in face-to-face teaching. But as it was at a distance, we had students do many nice online activities like Phet and Algodoo and it was very effective."*
Experience	13	K14: *"It is very valuable that we have gained experience if there is an epidemic or a hybrid learning model is adopted when we become teachers."*
Competence in Using Technology	13	K18: *"The most important contribution, I think, is our ability to use technology. Now I can use many applications that I couldn't use, that I was afraid of."*
Difference	5	K1: *"It was a difference for both students and us. We tried different methods; we got a new experience. We turned to online activities, these are very suitable for children, that is, for today's children."*

When Table 3 is examined, it is seen that the participants responded by approaching from many different aspects regarding the advantages of the online teaching practice. According to the participating pre-service teachers, the online teaching practice has many advantages such as conducting the lesson at the desired place and time, accessing it again, saving time, giving place to online activities in the lessons, gaining a different experience, preparing for a possible distance education and increasing their competence of using technology. Thus, it can be stated that the participants think that an effective experience is offered to them for teaching today's children living with technology through the distance education application.

Opinions of the Participants on the Disadvantages of Online Teaching Practice Compared to Face-to-Face Education

The participating pre-service science teachers were asked for their opinions about the disadvantages of the online teaching practice. The findings obtained as a result of the analysis of the collected data on the codes in the category of disadvantages are presented in Table 4.

Table 4.

Disadvantages of the Online Teaching Practice

Code	Frequency	Sample Quotation
Lack of Interaction	15	K21: *"Of course, interaction with students cannot be achieved as much as in face-to-face education. This may not be felt much in an experienced teacher; students can understand their teacher from his/her gestures and facial expressions. But the situation changes when you encounter a class for the first time."*

Hardware Problems	10	K5: *"We have always said that there are limitations such as not having a computer for every student, sound interruptions, and deterioration of the image."*
Access Problems	9	K13: *"We had problems such as the internet disconnection, some students not having internet and not being able to connect."*
Shortage of Attention Span	5	K20: *"It was a little difficult to motivate the students in front of the screen for a long time; they got distracted in a short time."*
Difficulty in Managing the Classroom	5	K25: *"Of course, classroom management proved difficult."*
Not Being Able to Implement Every Activity	5	K32: *"Online education forced us to choose different activities. This was good on the one hand because we improved ourselves, but on the other hand, it was difficult because we could not implement every activity."*

When Table 4 is examined, it is seen that the answers of the participants in the category of disadvantages of the online teaching practice include many disadvantages such as lack of interaction and hardware problems, access problems, short attention span, difficulty in classroom management and inability to implement every activity. Direct quotations from the participants' opinions also show that the participants mentioned many disadvantages of the process.

Opinions of the Participants on the Concerns They Felt during the Online Teaching Practice Process

The concerns felt by the participants during the online teaching practice process were examined. Six of the participants stated that they did not experience any concerns. The findings obtained as a result of the analysis of the answers of the other participants are presented in Table 5:

Table 5.

Concerns Felt during the Online Teaching Practice Process

Theme	Code	Frequency
Stemming from the Pre-service Teacher	Lack of experience	24
	Interaction	10
	Concern of failure	9
	Not drawing attention	9
	Classroom management	5
Uncertainty	Lack of knowledge of the process	20
Technical and Hardware Problems	Internet	12
	Lack of hardware	5
Lesson Plan	Difficulty in preparing the lesson plan	7
	Difficulty in implementing the lesson plan	6

When Table 5 is examined, it is understood that during the online teaching practice process, the pre-service teachers experienced problems stemming from the pre-service teachers themselves such as uncertainty of the process, technical and hardware problems and lesson plan-related concerns. Concerns stemming from the pre-service teachers themselves include the pre-service teachers' lack of teaching practice experience as well as distance education experience, difficulty in interacting with students, difficulty in drawing students' attention, and thinking that they will not be able to manage the classroom. In addition, the participants experienced concerns due to external factors such as the uncertainty brought about by the pandemic and the measures taken, the lack of internet access or disconnection, and the shortage of equipments possessed by both the participants and schools. Finally, the participants stated that they had problems preparing and implementing lesson plans for online activities. In fact, this finding can be related to the fact that they have not experienced such teaching before.

For example; P21 expressed his/her concerns as follows; "*It was a system that we had never implemented before or even had an idea about and we had concerns about how it would be since we were going to do the teaching practice for the first time, whether we could do it, whether we could prepare a lesson plan and whether we could manage the classroom."*

In addition, a significant majority of the participants felt concerned about the uncertainty of the process. The opinions of the participant best summarizing the opinions expressed within this theme are as follows:

P1: *"A distance education system, which we did not know at all, and schools steadily closing and opening worried me a lot. The students were at school sometimes and at home other times, and the same was true for the teacher. We were always at home. We were really in an equation with many unknowns."*

As determined in the findings in the theme of the disadvantages of the online teaching practice, the pre-service teachers stated that they experienced problems due to the lack of hardware and infrastructure and network problems during the online teaching practice. These problems caused concern for the pre-service teachers. One of the participants expressed his/her related opinions as follows:

P18: "*Especially when students were at school, teachers' internet was often disconnected. Sometimes the computer was having problems and they were connecting via their own mobile phones. All of these create stress before the lesson, wondering if it will happen again."*

There are participants who stated that they felt concerned due to the difficulty of preparing and implementing a lesson plan. One of the participants expressed his/her related opinions as follows:

P3: *"I was highly concerned because of not knowing what to do, whether it would be distance or face-to-face. The difficulty in managing the classroom and finding activities and planning the lesson in a way not known before. Broken connections, some of us do not have internet at home, or other siblings are also using the computer for distance education and thus, there is no computer … All of these create separate concerns and stresses."*

In fact, these explanations of P3 summarize the thoughts of all participants in general.

Opinions of the Participants on Classroom Management in the Online Teaching Practice Process

The participating pre-service teachers were asked their opinions about classroom management during the online teaching practice process. Nine of the participants stated that they did not experience any problems. The findings obtained as a result of the analysis of the responses of the other participants are presented in Table 6.

Table 6.

Classroom Management during the Online Teaching Practice Process

Theme	Code	Frequency
Activity	Planning interesting activities	18
	Using different materials	7
	Asking questions	5
	Using different methods and techniques	4
	Taking a break	4
Pre-service Teacher	Tone of voice	8
	Addressing students by their names	6
	Gestures and mimics	4

	Stress	2
Mentor	Mentor's interventions	9
	No interruption by the mentor	5

When Table 6 is examined, it is seen that the opinions of the participants who stated that they had problems in maintaining classroom management during the online teaching practice are gathered under three themes: activity, pre-service teacher and mentor. The participants who expressed their opinions under the theme of activity stated that they had difficulties in drawing students' attention during online activities, using different materials and methods/techniques and maintaining classroom management while arranging the breaks between the lessons. One of the participants expressed his/her relevant opinions as follows:

P20: *"Due to my inexperience in an online application, there were moments when the students became completely indifferent during the activities, which made it very difficult for me. If it was in the classroom, I could change the tone of my voice at such a time and take control of the class by changing the tone of my voice and changing the stress in my speech and even just by looking at them. It was a serious problem not to be able to do these."*

As pointed out by P20, another theme is related to the pre-service teachers themselves. In this theme, it is understood that they had difficulties in classroom management due to situations such as not being able to adjust the tone of voice, the difficulty of addressing the students by their names and the inability to use gestures and mimics. One of the participants thinking in the same line expressed his/her opinions as follows:

P3: *"I went through a process in which I didn't know what to do, especially until I became familiar with the process. At this stage, I realized that I could not adjust my tone of voice, and that I was speaking monotonously, therefore I could not stress important places. Students got distracted. Then I told myself "Stop!". Instead of blaming the system, I self-criticised and corrected myself."*

Undoubtedly, another factor that was as important as the pre-service teachers in this process was the mentors. Every attitude exhibited by the mentors in this process affected the quality of the process. In this context, some participants stated that they experienced classroom management problems due to the mentor's negative interventions or not being involved in anything during the process. For example, P11 expressed his/her opinions as follows:

K11: *"The mentor intervened at such a time that sometimes I got confused about what to say and what to do. I was losing contact with students and then it was very difficult to pull them together."*

Another pre-service teacher expressed his/her relevant opinions as follows:

P23: "*In this process, which we started with zero experience, I expected the mentor to assume a more directive role, that is, a guide, to facilitate the process and to help in classroom management. His/her leaving the whole control to us was an obstacle, in my opinion."*

Opinions of the Participants on Their Expectations from the Mentor and the Advisor in the Online Teaching Practice Process

The participating pre-service teachers were asked about their expectations from the mentor during the online teaching practice process. The findings obtained from the analysis of the data are shown in Table 7:

Table 7.

Expectations from the Mentor during the Online Teaching Practice Process

Category	Code	Frequency
Process	Assistance in classroom management	12
	Guidance	6
	Being understanding	4
	Sharing strategies	3
	Contributing to the efficiency of the process	2
Procedure	Lesson plan	16
	Materials	10
	Having students participate in the process actively	8
	Practice	4

When Table 7 is examined, it is seen that the participants' responses to the question "From which aspects did you expect your mentor to provide guidance for you during the online teaching practice process?" are gathered under two main categories: process and procedure. The participants' responses gathered under the category of the process were divided into the categories of helping the pre-service teacher in classroom management, providing guidance, being understanding, sharing strategies and contributing to the efficiency of the process. In this respect, some participants expressed their relevant opinions as follows:

P4: *"As a pre-service teacher, we do not have experience and we do not know the class. At this point, it is very important for the mentor to give advice about the process, show direction, and share strategies they have. But, it did not happen so."*

K30: *"I want the teacher at school to guide me, read my plan about the activities, give me different ideas and let me know what I should pay attention to and be a bit understanding. He/she should not expect us to behave as if we had 40 years of teaching experience."*

The other expectations of the pre-service teachers from the mentor were discussed in the category of procedure. The opinions expressed in this category include the mentor's feedback about the lesson plans prepared by the pre-service teachers, giving opinions and advice about the materials to be used in the lesson, helping pre-service teachers in ensuring the active participation of students and helping them during the practice. In this regard, some of the participants expressed their relevant opinions as follows:

P9: "*I expected him/her to share strategies that would help in classroom management, to share experiences about understanding and recognizing children, to evaluate and tell us what is right or wrong in our lesson plans.*"

P20: *"Why do we go to a school fan or internship, of course, to benefit from that teacher's experience, but the process is not efficient when the teacher leaves the control to us from the first day and sits in his/her office. I expect the teacher to criticize our lesson plans, to give information about the dynamics of the class, to help us at this point where we have difficulties in classroom management, and to give information about whether the lesson plan we prepared in that class or the material we will use will work."*

The expectations of the participants from the advisor were also questioned. Although the participants' expectations from their advisor are in line with their expectations from their mentor, the participants generally think that the mentor has a more decisive role in the process. The basic expectations of the pre-service teachers from both their mentors and advisors are to guide them, help them in classroom management, and share their experiences with them. In this regard, some pre-service teachers expressed their opinions as follows:

P13: *"Of course, it is important that our instructor at the university guides us. But the teacher in the school is the main guide in this process."*

K32: *"The instructor can also guide by sharing his/her experiences. He/she can give information and make comments about classroom management and the materials we will use in the lesson. But frankly, the university instructor is a bit far from the field, the information is always theoretical. The teacher is more effective, in my opinion."*

Finally, the participants were asked whether these expectations were met. The pre-service teachers who participated in the study stated that there were some problems from time to time, but in general, their expectations from both the mentor and advisor were met. Only five participants stated that their expectations from the mentor were not met and that they were not provided with enough guidance by him/her. Opinions of the participants representing both sides are given below:

P23: *"I myself was satisfied with my advisor. Although it was distance education, I was able to communicate easily. However, I cannot say the same for my mentor. He/she left the whole control of the process to us. As a result, he/she did not help in classroom management and did not provide enough guidance."*

K15: *"We had a very enjoyable distance learning process with our instructor. Weekly online meetings were very good. I can recommend that the meetings with the instructor should continue in this way after the pandemic. The teacher in our school was also very understanding. When necessary, he/she provided excellent guidance."*

4. Conclusion and Suggestions

It can be stated that interesting results were obtained in this study, which was carried out to determine the views of the pre-service science teachers about the online teaching practice process. It was found that the participants faced different obstacles in the process of online teaching practice, such as internal factors originating from the pre-service teachers themselves and external factors originating from the hardware and infrastructure and students. Among these; access problems, communication problems, interruption of sound and student distractions were frequently emphasized. In support of the results of this study, in many studies, the reasons for the limited use of technology by educators in their lessons are classified as internal factors originating from teachers and external factors originating from other problems (Ertmer, 2005; Ertmer and Ottenbreit-Leftwich, 2010; Georgina and Hosford, 2009). Similar points such as lack of infrastructure, need for technical support and student-related problems are emphasized as reasons for the low level of use of technology by educators in their classroom practices (US Department of Education, 2003). It is a pity that in the intervening decades, the lack of equipment and infrastructure still remains a problem today. Even if there is no distance education, technology integration into education has become a necessity in order to strengthen education and enrich learning experiences. These results show how important it is to develop and support teachers' technological pedagogical content knowledge (TPCK). Another study that concurs with the results of the present study was carried out by Bakırcı, Doğdu & Artun (2021). In their study, the researchers examined the distance education process carried out during the pandemic within the framework of the professional gains and problems of science teachers. As a result, it was determined that the teachers showed professional development in terms of using different computer programs and software, but the students were reluctant to participate in distance education, had low motivation and had difficulties in accessing the computer/internet. Again, parallel to the findings of the current study, Çakın and Külekçi-Akyavuz (2020) also stated that teachers had communication problems with parents and students in this process and that students were reluctant and did not have appropriate physical conditions. In the study conducted by Bakioğlu & Çevik (2020) to determine science teachers' views on distance education during

the pandemic, internet access problems, hardware problems, students' indifference to the lesson and lack of communication were emphasized as important problems regarding the process. As mentioned before, the teaching practice course, which has an important place in the development of pre-service teachers, was originally planned to be carried out in real schools and classrooms until the pandemic. For this reason, the conduct of this course in a virtual environment may affect the efficiency of this course and bring some limitations (Mutton, 2020; Gonzalez-Calvo et al., 2020).

The results of the current study are remarkable in terms of the problems defined as the problems arising from the pre-service teachers themselves. It is possible for pre-service teachers to experience these problems in the process of teaching practice carried out through face-to-face education. Online education may have exacerbated these problems. However, it is concerning that online education is seen to be the only responsible for the problems experienced. In fact, teaching practice is a process in which pre-service teachers put the theoretical knowledge they have acquired so far into practice and therefore have difficulties. The difficulties of the pre-service science teachers participating in the current study in the online education process may be related to their inexperience. Parallel to this, it is stated in the literature that teachers with less professional experience have less use of technology (Agyei & Voogt, 2011; Gao, Wong, Choy & Wu, 2011). One of the interesting results of the current study is that the participating pre-service teachers did not state that they had problems related to organizational culture, having information about administrative functioning and observing teacher-student interaction in the classroom in the online teaching practice process. However, the teaching practice carried out in the classroom environment in schools is also very important in relation to these aspects.

Suggestions made by the pre-service teachers for the solution to the problems focused on eliminating hardware and infrastructure problems and choosing appropriate activities. In this context, the first three suggestions frequently expressed by the participants are free internet service, tablet support, and including interesting activities. In the Global Education Report of the Pandemic prepared by Harvard University and the Organization for Economic Co-operation and Development (OECD) with the contribution of Bahçeşehir University, it is suggested that countries should improve their technological infrastructures and establish a balance between digital and non-digital teaching activities (URL-1). In addition, these findings of the current study are remarkable in that the pre-service teachers did not offer a solution for the problems arising from themselves. Technical infrastructure, hardware and internet access are of course important in terms of technology integration into lessons, whether being distance or face-to-face. However, the main factor that is at least as important as these is that educators should choose the right technological tools and use the technology effectively with appropriate pedagogical approaches. This situation shows the importance of the mastery of these competencies by pre-service teachers and teachers and thus educating themselves to do so.

Another finding of the current study is related to the opinions of the participants on the advantages of online teaching practice. The participants think that online teaching practice has advantages such as accessing information at the desired place and time, saving time and including online activities. These results are supported by many studies in the literature (Aslan Altan, 2021; Ünal & Durmuş, 2021). When the responses of the participants are examined carefully, it is seen that they generally made evaluations from their own perspectives. In addition, it is believed that pre-service teachers' use of Web 2.0 applications gives them a certain level of knowledge and skills. In support of this, in a study conducted by Kayaduman & Deliağaoğlu (2021), it is stated that teacher candidates gain an understanding of course designs based on web 2.0 technology integration.

The opinions of the participants on the disadvantages of the online teaching practice are in line with the problems they experienced in this process. Lack of interaction, hardware problems and internet-related problems were the most frequently emphasized disadvantages. In support of this, it is stated that the pandemic further deepened the digital inequality called the digital gap between individuals from different socio-economic levels (López, 2020; Mineo, 2020). This shows that it is possible to strengthen distance

education with a good technical support to be provided to learners and instructors. It is already known that deficiencies such as technical infrastructure are among the obstacles to technology integration into education (Ertmer & Ottenbreit-Leftwich, 2010). These results of the current study concur with the results of the study conducted by Ünal & Durmuş (2021) to determine the views of Biology, Chemistry and Secondary Education Mathematics pre-service teachers about the teaching practice course carried out through distance education applications during the pandemic. The researchers determined that the participating pre-service teachers experienced internet access problems, technical problems, communication problems and classroom management problems in the process. In the current study, difficulties in active participation, students' indifference to the lesson and limited interaction and shortage of teaching methods and techniques to be used were stated to be the disadvantages of the process. The main reason for the lack of interaction / communication problems mentioned here is the frequent use of text-based online communication tools, despite the rich media communication tools available for online environments (Wang, 2008).

In the current study, it would not be wrong to say that the pre-service teachers experienced intense anxiety in this process. Problems originating from the pre-service teachers themselves seem to be the primary reason for this anxiety. The inexperience of the pre-service teachers, their inability to interact, their worries about being unsuccessful and their difficulties in attracting students' attention made them anxious. In addition, the environment of uncertainty caused by the pandemic and the immediate transition to distance education process as a result of the pandemic may have increased this anxiety. The pre-service teachers, who entered a process they had never experienced before, experienced difficulties in developing and implementing online activities, which worried them. It is stated that the instructors who provide distance education for the first time experience anxiety, and it is stated that it is necessary to provide the instructors with examples of distance education that they can learn indirectly (Kayaduman & Demirel, 2019). Parallel to this, Bakioğlu & Çevik (2020) stated that the inability of science teachers to teach face-to-face in classrooms caused anxiety in most of them. The findings of this study show that as the experience of the participants increased, their anxiety decreased in the following weeks. Similarly, in the study conducted by Ralp (2004), the anxiety levels of the pre-service teachers before and after the teaching practice course were examined and it was determined that pre-service teachers' anxiety toward teaching decreased at the end of the teaching practice. Another reason that worried the participants in this process might be that the participants felt inadequate in the use of information and communication technologies, that they had anxiety about the use of technology and that their acceptance of technology was insufficient (Loewenstein, Weber, Hsee & Welch, 2001). Finally, as has been repeatedly stated, hardware and internet problems may have also caused them to feel anxious. These results are similar to results reported in the literature (Ünal & Durmuş, 2021).

It is known that pre-service teachers have difficulties in maintaining classroom management during the teaching practice process (Goh & Matthews, 2011). This may have made itself feel even more in online education. The majority of the participants stated that they had difficulty in maintaining classroom management, which was mostly due to the fact that they could not find activities that would attract the attention of students. The inexperience of the pre-service teachers can be identified as the reason for this situation. As the participants improve themselves, their competencies such as using online applications suitable for distance education, developing and applying activities will also improve. In addition, the deficiencies of the participants in terms of adjusting the tone of voice and addressing the students by their names made classroom management even more difficult. Parallel to this finding, Goh & Matthwes (2011) stated that pre-service teachers experience anxiety about the teaching profession because of not being able to maintain classroom management. Finally, the problems stemming from the mentors in schools also caused the problems of not being able to maintain classroom management. Similarly, Aslan Altan (2021) stated that pre-service teachers have difficulties in maintaining classroom management during the teaching practice carried out through distance education.

Mentors, who will guide pre-service teachers, are very important for efficient teaching practice to occur. The importance of mentors in the development of the teacher identity in pre-service teachers is strongly emphasized (Yuan & Lee, 2015). In addition, cooperation between the mentor and advisor is required. In the current study, it was concluded that the pre-service teachers expected their mentor to help them in classroom management, give feedback by examining their lesson plans, guide them, briefly share their experiences with them. The participants, who had similar expectations from the advisor, think that the mentor has a great influence on the success of the process. The majority of the participants stated that their expectations were met to a large extent. Supporting the current study, Hobson, Ashby, Malderez & Tomlinson (2009) stated that effective mentors in teaching practice offer better support to pre-service teachers. In other studies, with similar themes in the literature, the importance of experienced mentors in the teaching practice process is emphasized and it is stated that pre-service teachers want to receive support from teachers in terms of motivation, teaching planning and implementation (Piştav Akmeşe & Kayhan, 2021; Wiens et al., 2020).

In light of the results obtained in the current study, it can be suggested to provide internet support to the stakeholders of education, strengthen the technical infrastructure and eliminate hardware problems in order to benefit from online environments in education. In addition, it would be appropriate for pre-service teachers and teachers to receive training about applications that can be used in online education and pedagogical training that will strengthen online education, carry out undergraduate education with a focus on TPCK, and develop pre-service teachers' self-efficacy in the integration of technology into education. Some other suggestions to improve online teaching practice include the use of rich media communication tools for effective communication, the integration of online activities into teacher education programs, and the provision of pedagogical and technological training to other stakeholders, such as mentors and advisors, to enhance their involvement in the online teaching practice process. These measures can strengthen the overall effectiveness of online teaching practice.

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