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Exploring Perspectives of Secondary School Teachers on Technology Integration in Education During Pandemic

Pandemi Sürecinde Ortaokul Öğretmenlerinin Eğitimde Teknoloji Entegrasyonuna İlişkin Bakış Açılarının İncelenmesi

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ABSTRACT

This paper investigates how Covid-19 pandemic influenced secondary school teachers' attitudes and opinions towards technology integration in education. For this purpose, the study was conducted in phenomenological design. The participants of the study consisted of 25 secondary school teachers of different branches. Open-ended question form was used to obtain data. The data were collected during the spring semester of 2019-2020 academic year. According to the findings of the study, it is evident that perceptions of teachers participated in the study about technology integration in teaching and learning process are positive in general. However, teachers stated their negative experiences such as internet problems, lack of internet competence, lack of family support, motivational problems, insufficient feedback, time limitation and inappropriate home environment.

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ÖZ

Bu çalışmada, pandemi sürecinde (COVID-19) ortaokul öğretmenlerinin eğitimde teknoloji entegrasyonuna yönelik tutum ve görüşlerinin nasıl etkilendiği incelenmiştir. Çalışma, fenomenoloji deseninde yürütülmüştür. Araştırmanın çalışma grubunu farklı branşlarda görev yapan 25 ortaokul öğretmeni oluşturmuştur. Açık uçlu soru formuyla veriler elde edilmiştir. Araştırma verileri 2019-2020 akademik yılının bahar döneminde toplanmıştır. Araştırmanın bulgularına göre, araştırmaya katılan öğretmenlerin öğretme ve öğrenme sürecinde teknoloji entegrasyonuna yönelik algılarının genel olarak olumlu olduğu görülmüştür. Ancak, öğretmenler bu süreçte yaşadıkları olumsuz deneyimleri internet problemleri, internet kullanımına yönelik becerilerinin eksik olması, aile desteğinin olmaması, motivasyon problemleri, yetersiz dönüt, zaman kısıtlaması ve uygun olmayan ev ortamı olarak belirtmişlerdir.

1. Introduction

With the increased availability of the technologies, educational informatization has become an important factor (Norhayati, & Siew, 2004; Peeraer, & Van Petegem, 2011) by enriching students' experiences, providing instructional tools and shaping the curricula (Kim, & Jang, 2020). Therefore, technological advances have influenced all parts of society, and obviously, the current education systems cannot be apart from them (Nuere, & de Miguel, 2020). Based on this, technology has been widely used in teaching and learning processes (Hoyles, & Lagrange, 2010). For this reason, the use of technology in educational environments in the form of distance education has taken more attention and is considered as a key factor for the quality of teaching and learning process.

Integrating technology into classroom practices encompasses all environments and contexts in which technology plays a crucial role in learning (Cha, Park, & Seo,

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2020). It is stated that inclusion of technology as a sustainable pedagogical approach increases student motivation, interest (Hashmi, Dahar, & Sharif, 2019); learning efficacy, curiosity (Carle, Jaffee, & Miller, 2009; Idris, & Nor, 2010; Molins-Ruano, Sevilla, Santini, Haya, Rodríguez, & Sacha, 2014), and creativity (Shubina, & Kulakli, 2019). It removes the limitations of learning space and time (Singh, & Thurman, 2019; Xie, & Siau, 2020); it makes learning process more interesting, clear, interactive, and flexible; efficient and effective in time and energy for both teachers and students (Depdiknas, 2003). Fitriyadi (2013) emphasized that the integration of technology provides active and interactive communication between teachers and students, and makes students independent learners. Similarly, Kim (2020) stated that technology integration can be an appropriate mean for communication among participants as well as instructors. Hence, it can be concluded that the use of technology in the classroom is important in terms of supporting and fostering the teaching and learning process and improving the quality of learning.

Technology-related factors are not solely enough to accomplish the purpose of technology integration (Arntzen, & Krug 2011; Ertmer 2005; Kimmons, Miller, Amador, Desjardins, & Hall, 2015). Essentially, beliefs teachers hold determine how and whether they integrate technology into classroom practices (Deng, Chai, Tsai, & Lee, 2014; Inan, & Lowther 2010a). A teacher's pedagogical belief refers to the usefulness of and difficulty related to technology integration, which affects whether they use technology for teaching process (Inan, & Lowther, 2010b; Ottenbreit- Leftwich, Glazewski, Newby, & Ertmer, 2010; Vannatta, & Fordham, 2004). Teachers' attitudes and practices in the process of technology integration are vital driving forces (Gibbone, Rukavina, & Silverman, 2010). In a way, it can be said that teachers' pedagogical beliefs shape their attitudes and practices towards the use of technology in their instruction. As stated by Ajzen (1991), people's beliefs influence their attitudes toward certain actions. In this process, teachers must be able to utilize technology as a tool in learning environment (Shelly, Gunter, & Gunter, 2010). Thus, meaningful technology use can be seen in educational environment. At this point, studies on innovations in education show that technology integration can be understood clearly when teachers' pedagogical beliefs are considered (Ertmer, 2005; Lim, & Chan, 2007; Liu, 2011; Sang, Valcke, van Braak, & Tondeur, 2010). According to a study conducted by Wozney et al. (2006), teachers' beliefs towards technology show a significant amount of variation (33%) in the use of technology in classroom practices. The results of a study conducted by Sang et al. (2010) showed that teachers with stronger constructivist pedagogical belief were more in tendency to integrate technology into teaching process than teachers who did not have that belief. A large-scale survey conducted by Becker (2000) concluded that teachers' decisions about the use of technology are influenced by their pedagogical beliefs. Similarly, teachers who have higher value in beliefs are more likely to utilize technology for learner centered instruction and for higher-order, critical thinking assignments (Ertmer et al., 2012; Hixon, & Buckenmeyer, 2009; Hsu, 2016). Accordingly, Ertmer et al. (2012) pointed out that teachers' beliefs about the value of technology for classroom practices are remarkable for effective technology integration. Based on these findings, it is noteworthy to emphasize that teachers with more positive beliefs and attitudes towards technology play a key role in performing technology-related classroom actions. Based on the above review, it can be said that technology integration makes educational environment effective and efficient. In other words, integration of technology into the classroom makes a significant contribution to teaching and learning process.

The Role of Technology in Educational Context during the Pandemic

On 11 March 2020, it was declared by the World Health Organization (WHO) that the infection caused by the coronavirus COVID-19 had passed to the category of pandemic (Dong, Du, & Gardner, 2020). Due to COVID-19 crisis, there have been a series of transformations in different parts of life. During this process, governments have taken many serious measures in the field of education (Espino-Díaz, Fernandez-Caminero, Hernandez-Lloret, Gonzalez-Gonzalez, & Alvarez-Castillo, 2020). Within this context, the schools, colleges and universities have shut down, which resulted in an increasing move towards online teaching as an only option left (Mishra, Gupta, & Shree, 2020), and it has led the institutions to go to online mode of pedagogy and scramble different technologic pedagogical approaches (Dhawan, 2020). As other countries around the world, Turkey has taken many measures to reduce the impact of pandemic in teaching and learning process. Within this context, formal education has been suspended by the Ministry of Education (MoNE) and The Council of Higher Education (CoHE) due to COVID-19.

This process requires teachers to adopt teaching online. In addition, in the pandemic process, teachers are expected to take more responsibility and support their students (König, Jäger-Biela, & Glutsch, 2020). For this, teachers' role as a facilitator in the effective use of technology is essential to achieve the learning objectives during technology integration process, especially after the COVID-19 crisis (Espino-Díaz et. al, 2020). Therefore, their opinions on technology integration are important, which will directly affect how they manage this pandemic process. Based on this, the present study was set out to investigate secondary school teachers' opinions on technology integration in teaching and learning process and to examine how Covid-19 pandemic influenced their attitudes and opinions towards technology integration in education.

The following research questions were addressed to guide the present study in order to provide depth and breadth into the technology integration in the implementation of education.

1. What are the opinions of secondary school teachers on the role of technology in education?

2. What are the positive and negative experiences of secondary school teachers on using technology during pandemic?

3. What are the attitudes of secondary school teachers towards technology use in education after pandemic (Covid-19)?

4. What are the opinions of secondary school teachers on using technology after pandemic?

2. Method

In this part, information about the model of the study, the sample of the study, data collection tool, data collection process, data analysis and validity and reliability are provided.

2.1. Research Model

In the study, phenomenological design, one of the qualitative research methods, was used. The purpose of the phenomenological design is to reveal how a particular phenomenon is perceived by individuals in a particular situation. In this approach, in-depth information collected through methods such as interview, discussion and participant observation. In addition, this approach is based on individuals' experiences, personal knowledge and subjectivity (Creswell, 2018; Padilla-Díaz, 2015; Patton, 2002). In this study, "the role of technology in education during the pandemic" was determined as a phenomenon which was examined based on secondary teachers' opinions and experiences.

2.2. Study Group

The study group consisted of 25 secondary school teachers of different branches working in Afyon province, Turkey. The convenience sampling method was used in determining the participants. In convenience sampling method, members of the target population who are conveniently located around a location are included (Edgar, & Manz, 2017). In addition, volunteering was taken as a basis and the teachers who wanted to take part in the study were included. 15 female and 10 male participants were included in the research process. 11 of the participants have 1-10 years of work experience, 8 of them have 11-20 years of work experience, 6 of them 21 years and more work experience. Of the participants, 8 were English teachers, 5 were math teachers, 5 were Turkish teachers, 4 were science techers, 3 were social science teachers.

2.3. Data Collection Tool

In the study, open-ended questions prepared for the teachers by the researchers were used to obtain data using the questionnaire technique. In the questionnaire, there were four questions on teacher's beliefs and attitudes towards technology use in the classroom environment. In order to determine the questions to be asked to the participants, a literature review was made regarding technology integration in education and studies related to the subject were examined. In addition, while forming the questions, the opinions and suggestions of two field experts, who have been working as assistant professors in an education faculty of a state university in Turkey in the field of curriculum and instruction, were taken in terms of such criteria as understandability, clearness, content validity and number of question. Based on this, firstly six questions were prepared. Open-ended questions were prepared to reflect the purpose of the study in the best way. A great attention was paid to include questions that enable teachers to express their views in detail. The questions were also checked in terms of suitability, clarity and comprehensibility. Based on the feedback taken from the field experts on the questions, the question number was reduced to four and two questions were removed. The field experts stated that the questions were similar to each other and they were not needed to be included. As a result, the questionnaire was finalized as follows:

1. What do you think about the role of technology in education? Can you please explain your positive or negative opinions on this issue?

2. What are the positive or negative experiences you have had in using technology in educational process during pandemic?

3. Do you think that your attitudes on the role of technology in education have changed after pandemic process? If yes, please explain in what way your opinions have changed.

4. Do you think that you will go on using technology after the pandemic ends? Please state your reasons.

2.4. Data Collection Process

There is no contradiction to scientific ethics in conducting this research according to the Ethical Committee of Tokat Gaziosmanpasa University Social and Human Sciences Researches dated 24.11.2020 and numbered 33490967-044.

Teachers were informed about the aim of the study and the teachers who wanted to take part in the research were included in the study. Then the question form was sent to 35 secondary school teachers via e-mail. However, 6 teachers did not answer the questions and 4 teachers answered partially to the questions. As a result, 25 secondary school teachers who could be reached and answered all questions were included as the participants of the study. The teachers sent their answers to the researchers via e-mail due to pandemic process. Data collection process was conducted in the spring semester of 2019-2020 academic year and lasted one month.

2.5. Data Analysis

Content analysis method was employed to analyze the obtained data. Content analysis is a method used to make valid inferences from the data obtained in accordance with the content. The purpose of content analysis is to obtain a comprehensive and broad description of the phenomenon under consideration (Elo, & Kyngäs, 2008).

In the content analysis, manifest analysis or latent analysis can be conducted according to the aim of the researcher. In a manifest analysis, the researcher describes what the informants actually say, stays very close to the text, uses the words themselves, and describes the visible and obvious in the text (Bengtsson, 2016). In addition, codes can be created deductively or inductively. When the codes are created inductively, as more data is available, codes may change (Neuendorf, & Kumar, 2015). In the current study, manifest analysis was conducted and what has been said was tried to be presented. Also, the codes were inductively created.

Firstly, in data analysis, the research questions aimed to be answered through the study were taken as a basis. Therefore, the replies of the teachers for each question were analyzed separately. Neuman (2012) states that the codes are obtained by examining the obtained data several times. On the other hand, Yıldırım and Simsek (2008) indicate that in content analysis, coding can be made according to the concepts

extracted from the data. Based on this, at this stage researchers examined the obtained data, and tried to divide the data into meaningful sections and find out what each section meant conceptually. Each identified meaning unit was labeled with a code. In this process, the original text was re-read and the emerged codes were reexamined. After obtaining the codes, they were categorized, and the themes were identified. The obtained codes and themes were summarized as a table to allow the readers to get a quick overview of the results. Lastly, a final check was conducted by the researchers.

2.6. Validity and Reliability

In the study, to ensure validity, the data were presented with direct quotations without changing the teachers' views. In addition, the answers of the secondary school teachers for the questions were analyzed in detail. For the reliability of the study, the researchers first reached a consensus on whether the coding and the themes determined were arranged correctly by discussing. In order to calculate the consistency rates of the codes created in the study, the obtained data were coded separately by the researchers and two field experts. It is stated that the coding has a high reliability if the consistency rate between codes is above 80%. In this study, the formula of Reliability = [Agreement / (Agreement + Disagreement) x 100] was used in calculating the rate of consistency between codes (code compatibility rate). According to this formula, 31/(31+3)x100=%91 was found, which shows that coding made in the research has a high reliability (Miles, & Huberman, 2015).

The required corrections were made in line with the opinions received. In the process, as an example of correction, the field experts stated that the names given to some themes were not appropriate, and more general names should be given to these themes. For example, in Table 4, the themes were first determined as "yes", "no", and "partially". However, the field experts expressed that these names were not appropriate. Therefore, these themes were changed as; "wish to use", "wish to use partially", and "unwilling to use".The answers given by the participants related to each question were processed according to the themes determined, the lists were made, the findings were defined and interpreted. The names of the teachers were not explicitly given in the findings part, but were coded as T1, T2,… T25. The participants' characteristics and research process were clearly defined and associated with the findings of other studies.

3. Findings

The findings of the study are presented as follows in accordance with the sub-problems of the study.

3.1. Opinions of Teachers on the Role of Technology in Education

Within the first-sub problem of the study, it was aimed to determine the opinions of teachers on the role of technology in education. It is seen that teachers' opinions were grouped under two themes as "Contribution to Learning Process" and "Problems Caused by Technology." The obtained themes, codes and the frequencies are presented in Table 1.

Table 1. Teachers' Opinions on the Role of Technology in Education

Themes	Codes	*n*
Contribution to learning process	Indispensable part of education	23
	Helps students	6
	Helps teachers	4
	Facilitates learning	4
Problems caused by technology	Harmful when used inappropriately	3
	Requires additional infrastructure	2
	Ineffective	2
	Causes information pollution	1
	Causes problems for students	1

As seen at the Table 1, opinions were grouped under the theme of "contribution to learning process." Under this theme, the first code was as; "indispensable part of education." On this issue, for example, T1 stated; "In the century we live in, we cannot think of technology, which is an integral part of our daily life, apart from education." T11 emphasized;"I think technology is an indispensable part of education today." T13 expressed; "Technology is an indispensable component of today's world." Similarly, T25 said; "I think technology has an indispensable place in education.".

The teachers (n=6) stated that the use of technology in education helps students in many ways. For example, T1 stated; "It is beneficial in attracting students' attention, increasing attendance, and diversifying the educational environment." T7 stated; "It increases students' attention levels and engagement." T16 said, "It provides great opportunities to encourage students to learn and to progress at their own pace." T23 emphasize;"Technology increases the problem solving and creative thinking skills of students."

On the other hand some teachers (n=4) have the opinion that the use of technology in education helps teachers in many ways. For example, T3 stated; "There are many benefits of technology, and it contributes to teachers in the teaching process." T8 expressed her ideas as; "It helps us save time. In this way, we can access information quickly."T10 indicated; "It helps teachers access a lot of information in minutes."

Some teachers (n=4) stated that technology facilitates learning. For example, T12 said; "I think technology makes it easier to learn and teach in a concrete way." T14 stated; "Thanks to technology, it is easier to provide a more creative learning environment with new learning techniques." T21 said, "I believe that technology will make education more permanent, effective and efficient, as it will increase the diversity."

Other opinions of teachers were grouped under the theme of "problems caused by technology." For example, T5 stated; "I observe that technology is harmful when used excessively. At this point, teachers should take more responsibilities at school and at home." T20 expressed; "If used correctly and consciously, technology will provide benefits for students significantly. But, it isn't used correctly, so it can harm students."

Some teachers (n=2) stated that additional infrastructure is required to accomplish technology use in education. For example, T18 expressed her ideas as; "The conditions and

the infrastructure should be improved to benefit more from technology."

Some teachers (n=2) expressed that technology use in education is not effective. For example, T2 said, "No matter how technology develops, it should not replace the teacher and it cannot provide the warm classroom environment of face-to-face education." T6 expressed his negative ideas as; "The impact of technology today is not very high. In other words, when we do not use technology in education, it is possible to provide the same quality education. I don't think it's effective." On the other hand, T9 stated; "Technology can cause high level of information pollution." Lastly, T24 stated; "There are some negative aspects of technology use in education and it can cause some problems for children such as social incompatibility, psychological disorder, and language development problems."

3.2. Positive and Negative Experiences of Teachers During Pandemic

In the second sub-problem of the study, it was aimed to determine the positive and negative experiences of using technology in education. The themes, codes and the frequencies related to this sub-problem are presented in Table 2.

Table 2. Teachers' Positive and Negative Experiences

Themes	Codes	*n*
Uninterrupted education	Continuous of education	10
	Easy access to education	4
Professional development	Teacher development	3
	Increased competence in teaching	2
Problems in learning process	Internet problems	23
	Lack of ability of teachers in internet use	5
	Lack of family support	3
	Motivational problems	2
	Insufficient feedback	2
	Time limitations	1
	Inappropriate home environment	1

The teachers mentioned about their positive experiences during this process. It was seen that teachers' positive opinions were grouped under the themes of; "uninterrupted education and professional development." Teachers emphasized that they could communicate with the students easily via technology. For example, T15 stated; "I'm in touch with students and families all the time. So, this is a big advantage for us. We can communicate with the students with the help of technology during this process." On the other hand, T22 stated; "Thanks to technology, we had the opportunity to be informed about our students and direct them."

Another positive experience of the teachers was that this process was a big opportunity for them to improve themselves. For example, T4 said;"In order to benefit from the opportunities offered by technology, to help my students, to support education, I had the opportunity to improve myself by watching various videos and consulting with my colleagues." Similarly, T13 indicated;"I realized that there were many other computer programs that I didn't know. I have got new information and my curiosity in this field has increased."

On the other hand, teachers expressed their negative experiences they faced while using technology in education during pandemic. These experiences were grouped under the theme of "problems in learning process". Most of the teachers (n=23) said that they had internet problems and infrastructure was not efficient. For example, T1 said, "The lack of infrastructure is a big problem. We cannot reach all of the students due to the internet problem. I also have connection problems during the lesson." T3 stated, "Internet is very low and there is no internet access of some students." T15 stated; "Some students do not have internet access or computers. So, they cannot use the system. It is a big problem." Similarly, T19 indicated; "The main drawback of the process is that we cannot reach all students due to internet problems."

Some teachers (n=5) stated that they were not efficient in using the technology and therefore they faced many difficulties. For example, T3 indicated; "When I first heard about distance learning, I was hesitant about how we can use this system, I was worried because I think I'm not competent enough in technology use." In addition, T12 said; "I was very worried about how to do it when I was preparing for the first synchronous lesson because it is not like face to face education."

Some teachers (n=3) stated they could not get enough support from parents. T1 said; "We cannot get the necessary support from parents." Similarly, T5 indicated; "I could not get the enough support and help from the parents." Lastly, T7 said; "Some families do not want to be in WhatsApp groups, they do not help us".

Some teachers (n=2) stated that students' motivation decreased significantly in this process. For example, T9 said; "The motivation of the students is very low." T24 stated; "I have not been able to catch the interest and attention of children towards activities in the classroom environment in distance education."

Two teachers said that they could not get enough feedback from their students during this process. On this issue, T8 said, "I cannot check if the documents shared have reached the students, I cannot take feedback from students." On the other hand, one teacher mentioned about the time limitation allocated for the classes. T10 expressed her ideas as; "The fact that the time allowed for the lessons was limited to one or two hours a week reduced the efficiency of the lesson." Lastly, T20 said; "There is no appropriate studying environment for students at home. They do not have their own rooms and they stay with other siblings. This is one of the factors that decreases the efficiency of the system."

3.3. The Attitudes of Teachers towards Technology Use in Education After Pandemic (Covid-19)

In the third sub-problem of the study, it was aimed to determine whether teachers' attitudes towards technology use in education changed after pandemic. The themes, codes and the frequencies related to this sub-problem are presented in Table 3.

Table 3. Changes in Attitudes of Teachers towards Education After Pandemic

Themes	Codes	*n*
Benefits for teachers	Increased awareness	12
	Understanding the effectiveness of the system	5
	Increased technology competence	3
No changes in attitudes	Ineffective before and after pandemic	3
	Same problems as before pandemic	2

Teachers mostly (n=20) stated that their attitudes towards the use of technology changed positively after pandemic and their ideas were grouped under the theme of *"benefits for teachers".* On this theme, teachers stated their opinions. For example, T1 stated; *"Technology has become mandatory in education. In my classes, I did not use technology much before, but now it is not possible to teach and reach students without technology."* T4 indicated; *"Before the pandemic, I thought that technology was important in education and that it was needed to be improved. I realized once again how important technology is in education in the process after the pandemic."* T17 indicated; *"I understood the importance of technology more after Covid-19, and positive technological developments in education have increased the importance of technology."* Similarly, T21 said, *"My attitudes changed positively and I decided to use technology more effectively in my lessons."*

However, it was seen that there were no changes in the attitudes of teachers towards technology use in education. In addition, some teachers expressed that their attitudes changed negatively. These opinions were grouped under the theme of "*no changes in attitudes*." For example, T2 said, *"There are serious differences between using technology at school and at home. 60% of the classes can be taught, but it is not possible to reach each student. Inputs and outputs cannot be controlled, measurement and evaluation are disrupted. So, I realized that technology in education is not effective."* T20 said, *"In fact, there was no change in my attitude towards technology. However, in this process, I have to use technology more intensively and functionally."* T24 said, *"In this process, compared to face to face education; I think it decreases the performance of children and teachers and the efficiency of education. I came to the conclusion that we cannot achieve the success we want in education by using only technology."*

3.4. Teachers' Opinions on Using Technology After Pandemic

In the last sub-problem of the study, it was tried to examine whether teachers want to use technology in education after pandemic. The themes, codes and the frequencies related to this sub-problem are given in Table 4.

Table 4. Teachers' Opinions on Using the Technology After Pandemic

Themes	Codes	*n*
Wish to use	Considering technology as indispensable	12
	Desire to use more	3
	Desire to use for self-development	2
Wish to use partially	Supporting face-to-face education	2
	Prefer to use when necessary	1
	Lack of family support	1
Unwilling to use	Inappropriate	2
	Not beneficial	1
	Difficult to access	1

Most of the teachers (n=17) stated that they want to use technology in education after pandemic under the theme of "*wish to use*". For example, T3 indicated; "*Of course. Technology is now at the center of our lives."* T7 emphasized; *"Yes, we have already been using technology in education; but now I know I will use it more."* The other opinions on this issue are as follows: *"I will continue to use technology intensively."* (T14)*"Yes, I want to use it. I think technology has made our lives easier. I also think that it is more effective and remarkable when I teach using technology."* (T21) *"I want to use technology in the future. With the integration of technology into the learning process, accessing other information outside the book can offer students many different ways to learn a concept. As teachers, we should find creative ways in teaching process."* (T25).

Some teachers (n=4) stated that they will use technology partially after the pandemic ends under the theme of "*wish to use partially*". For example, T6 said; *"In the first stage, of course, I take the face-to-face teaching as a base, but I would like to use it if necessary."* Similarly, T19 indicated; *"I think I will use it as long as necessary, but it is a fact that one-to-one communication will always be more effective."*

On the other hand, some teachers (n=4) stated that they do not want to use technology in education after pandemic ends under the theme of "*unwilling to use*". On this issue T2 said; *"I do not want to use distance education system after pandemic, because an environment where all students are ready for distance education at the same time may not be created. Families may not be ready for this training and may react differently. Also, technologically, not all families may have the same technological devices. This causes inequality of opportunity in education."* T9 indicated; *"I think it would be more beneficial and effective to do practices and studies through face to face education."*

4. Results and Discussion

In this section, the research questions were discussed in the direction of the findings obtained and compared to the relevant study findings in the literature. The purpose of this study was to investigate teachers' opinions on technology integration in teaching and learning process and to examine how Covid-19 pandemic influenced their attitudes and opinions towards technology integration in education. Based on the results of this study, it is evident that the perception of teachers participated in the study about technology integration in teaching and learning process is positive in general.

Within the first-sub problem of the study, it was aimed to determine the opinions of teachers on the role of technology in education. Based on the findings related to the role of technology in education, it is seen that most of the teachers consider technology as an important issue in education and they have positive opinions on the use of technology in educational environments. It can be said that these teachers are aware of the importance of technology integration into the teaching process. Accordingly, integration of active technology tools such as smart whiteboards and clickers can help students and contribute to foster student engagement and enhance learning process (Chan et al., 2016; Daniel, & Tivener, 2016; Freeman et al., 2014; Park, 2014). Similarly, Siegel and Claydon (2016) indicate that the uses of technology are not only for instruction, but they contribute to the teaching and learning environments where students can be actively engaged. According to the study conducted by Carr-Chellman and Dyer (2000), one of the purposes of learning technologies is to get better learning outcomes in learning process. In light of this information, it is clear that advantages of technology use in the classroom have positive influences on teachers, students, the quality of learning environment and process. Apart from that, it can be claimed that the use of technology can enhance interaction between teacher, student and the educational environment where technological materials are shared.

Teachers' negative opinions on technology integration process were also investigated. The most striking issues emerging are that teachers think technology is harmful when used inappropriately and requires additional infrastructure. The participants believed that technology has negative effects when used excessively and infrastructure related problems should be improved. In this context, it can be claimed that opportunities to use technology in education should be equally provided to teachers and students. In addition, some teachers think that technology integration is ineffective and technology can not be replaced with face-to-face education. These results may be due to that teachers get used to traditional education system, thus they cannot adapt technology for learning process.

In the second sub-problem of the study, it was aimed to determine the positive and negative experiences of using technology in education. The teachers mentioned about their positive experiences during this process. Two notable findings of the current study are that the teachers think that technology provides uninterrupted education and professional development within their positive experiences. Notably, student learning can be promoted through an active learning technology, which enables the effective and convenient learning environment. Based on the data obtained, it is crucial to note that teachers' self-confidence about the use of technology can increase and they can improve themselves by using new technologies. Thus, technology can play an important role in promoting teachers' instructional practices.

When examining the responses teachers provided for describing their negative experiences during technology integration process, the most apparent finding is internet connection problems which play a key role in limiting the technology integration process. This result supports previous research (e.g. Ertmer, 1999, 2005; Hew, & Brush, 2007) which show that access to technology is one of the leading factors that provide teachers with opportunity to integrate technology into the learning environment. Similarly, Kim (2020) stated that limited access to online learning tools such as computers is one of the limitations of online learning. Previous studies (Francom, 2020; Onalan, & Kurt, 2020; Vann, Sanchez, & Santiago, 2015; Williams, Warner, Flower, & Croom, 2014) indicate that the access to resources, when technology became outdated or was sometimes limited, was one of the notable barriers of online learning.

Lack of ability of teachers in internet use is one of the most challenging issues in technology integration process. This is consistent with the argumentation of Groff and Mouza (2008) and Kim (2020) stating that teachers' lack of computer knowledge and experience are the two most notable challenges for teachers applying instructional technology in education. In the study conducted by Onalan and Kurt (2020), it was found that teachers perceived themselves as proficient in commonly-used programs such as wordprocessing and presentation software. However, teachers' perceived knowledge about using specialized software or special applications was found to be quite low. In their study, Espino-Díaz et. al. (2020) found that there was a significant gap between the use of information and communication technologies and its application in the classes. Hartman, Townsend and Jackson (2019) reported that in their study 50% of the teachers perceived getting training on technology medium need and 37% as a high need. Similary, Gu et al. (2013) found that teachers were willing to integrate technology into the classrooms, but they did not have adequate confidence and competence. Similar finding was found in the study by Demir and Bozkurt (2011) which showed that competences of teachers were one of the leading factors influencing their perceptions related to the use of technology in teaching process. In addition, inadequate professional training on technology for teachers is seen as the most notable barrier (Araujo, & Luiz, 2015; Bleakley, & Mangin, 2013; Merc, 2015; Petersen, Finnegan, & Spenser, 2015; Singh, & Hardaker, 2014). It can be argued that negative experiences such as lack of family support and motivation, and time limitation indicate that effective integration of technology in education requires more than just providing students with computers. It is important to emphasize that there must be a need to consider these factors for a successful implementation of instructional technology which is considered as a key element of 21st century.

Within the framework of the third research question, it was aimed to determine whether teachers' attitudes towards technology use in education changed after pandemic. The current study confirmed that teachers' readiness and attitude for using technology is a starting point for technology integration process. In this context, it can be said that teachers' views on technology determine whether they integrate technology into their classrooms effectively. This finding is congruent with the study of Parr (1999) which indicated that teachers' perceptions of learning technologies are likely to be primary factors in the successful implementation of technology in education. Similar findings were found in the study conducted by Zhao (2007) which showed that teachers' opinions on technology integration affected their use of technology in teaching process. However, it was seen that there were no changes in the attitudes of some teachers towards technology use in education. Based on the obtained findings, it is important to

note that if teachers have strong beliefs on technology integration into the classroom, these beliefs are not influenced by temporary situations such as pandemic. Also, these results strongly support the assumption that teachers' perceptions determine the way that the learning technologies were applied. It can be said that teachers need to regard learning technologies as part of teaching process to implement technology in education effectively.

In the last sub-problem of the study, it was tried to examine whether teachers want to use technology in education after pandemic. Most of the teachers stated that they want to use technology in education after pandemic. Some teachers stated that they will use technology partially after the pandemic ends. The use of technology in classroom can be related to teachers' self-efficacy beliefs (e.g. Lee, & Lee, 2014; Wang, Ertmer, & Newby, 2004). Also, it can be said that teachers, who will use technology in education after pandemic, can consider the requirements of the 21st century learning and think that technology should be an indispensable part of classrooms. Apart from that, they may be of the opinion that technology integration can facilitate learning process, enhance the flexibility of learning and provide meaningful use of technology in education. On the other hand, some teachers state that they do not want to use technology in education after pandemic ends. Based on the explanations of the respondents, one can claim that these teachers do not perceive technology as a value to use in classrooms, and thus technology is not regarded as an integral part of learning process.

Consequently, the current research addressed to make contribution to the existing literature by exploring the secondary school tearchers' opinions on technology integration. Distinct factors of teachers' use of technology was found by investigating teachers' opinions on technology integration in teaching and learning process and by examining how Covid-19 pandemic influenced their attitudes and opinions towards technology integration in education. This study has strengthened the idea that teachers' opinions, beliefs and experiences shape their decisions towards technology integration into learning process before and after pandemic. In addition, the current study provides exemplary and meaningful experiences of teachers in technology integration process for the related literature and has gone some way towards enhancing our understanding of teachers' technological beliefs. Learning teachers' views can provide successful implementation of technology-integrated education process. In other words, this study does offer valuable insight into the integrity of technology in education. Lastly, the findings obtained may be the key to help teachers for integrity of technology more fully into their instruction.

Based on the results of the study, the following suggestions and future research directions can be considered in technology integration process.

- The findings of the first sub-problem of the study show that according to the teachers, technology has negative effects when used excessively and infrastructure related problems should be improved. Based on this, it is recommended that internet infrastructure should be strengthened especially in countrysides. The government should make more investments to support teachers and students who cannot access the internet.
- Within the second sub-problem of the study, teachers mentioned about their negative experiences in using technology. Based on these findings, it is recommended that workshops about effective technology integration should be organized to enhance teachers' technology integration abilities and skills. In addition, it should be tried to increase the awareness level of teachers about using technology in education.
- Similar studies can be carried out with students to identify their perceptions related to technology.
- Similar studies can be carried out with teachers in different fields and using different variables.

Despite promising findings of this study, it has some limitations. This study is limited to 25 teachers working at different secondary schools in Afyon province, Turkey. Teachers working at other school stages can be included to support the generalization of the results of the current study. Also, conducting studies considering different variables will contribute to the use of technology in learning and teaching process. The data of the study were obtained through the open-ended questions prepared by the researchers. In the following studies, online or face-to-face interviews can be conducted with teachers. Lastly, the current study was conducted in Afyon province, Turkey. Therefore, generalization of the results to other provinces in Turkey is hardly possible. However, it is assumed that teachers working in different provinces in Turkey have similar problems and experiences during COVID-19 pandemic.

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