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## TEACHING SCIENCE THROUGH DISTANCE EDUCATION DURING THE COVID-19 PANDEMIC


*Research article*

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# TEACHING SCIENCE THROUGH DISTANCE EDUCATION DURING THE COVID-19 PANDEMIC

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## Abstract

The aim of the present study was to evaluate the views of parents regarding middle school students' learning of science at home via the Educational Information Network, prepared by the Turkish National Ministry of Education, during the course of urgent distance education to which an immediate obligatory transition was made with the outbreak of the Covid-19 pandemic. Of the qualitative research methods, the basic qualitative research model was employed in the present study. The participants of the study were the parents of 6th grade students attending a middle school in the Central Anatolian Region of Turkey. The maximum diversity sampling method was utilized for sample selection in the study. Accordingly, the study was conducted with 17 parents of students, who possessed different features and were willing to participate in the study. The results of the research study revealed that generally parents believed that science education via EBA was beneficial for the students that the visuals and videos used during science instruction were arresting, that EBA was an enjoyable platform, and it had advantages such as the possibility to do experiments virtually.

*Keywords:* Covid-19, pandemic, distance education, EBA, science education, middle school, parent

## 1. Introduction

The Covid-19 pandemic, which initially emerged in the city of Wuhan in China at the end of the year 2019, has taken hold of the entire world. One of the areas that the pandemic has impacted the most, in fact profoundly shaken, is education (Erkut, 2020) because in almost all countries it was education that first came to a halt to control the pandemic. Subsequently, to minimize the adverse effects of this situation, the decision was taken to make a transition to distanced learning (Sahu, 2020; Erkut, 2020). However, this so-called urgent distance learning, which started without a detailed education design and plan, has virtually been a process of crisis management. Hence, each institution has been overcoming this crisis by means of different solutions (URL-1).

When compared with the other European countries, Turkey faced the Covid-19 at a relatively later stage. However, after it was understood that the pandemic was going to spread, the applications of countries that began struggling with the virus earlier than Turkey were evaluated. Accordingly, with the World Health Organization declaring a pandemic on 11th March, 2020, Turkey also initially gave a short break to education and soon after started distanced education (Ministry of National Education [MEB], 2020). During the one-week halt

in education, the Ministry completed its work on two pathways that it planned to adopt in distanced education: the online educational platform called Educational Informatics Network and the Educational Informatics Network TV (EBA TV). Established by the Ministry of Education and the Turkish Radio and Television Association, EBA TV consists of three new channels. In these channels, a program designed for classes, in which prerecorded lessons are broadcasted, is shared with the students throughout the day. Moreover, students were provided with the opportunity to benefit not only from EBA TV but also from a website developed by the National Ministry of Education and has been in use since the year 2011, namely EBA, to which new features such as online lesson functions were added (Özer, 2020). However, as evident, this has been a rapid transition. Numerous students and teachers who had no prior experience in distance education were suddenly subjected to this experience (Laplante, 2020). Even though this transition had positive aspects such as ensuring the sustainability of education, and preventing disruptions in students' graduation times and falling behind a term, as it was an urgent transition, it also raised certain discussions regarding its feasibility and efficiency (Sahu, 2020). At the center of the discussions have been the concern that practical lessons would be disrupted. It can be stated that the subject of Sciences has an important and special place at this point because not only is sciences a subject that includes abstract topics, but it is also a practical subject that requires many different methods of application, such as experiments and projects. On the other hand, as a branch of science that stemmed from research conducted to gain insight into and understand nature, sciences is intertwined with the technologies developed for these purposes and, in fact, its contribution to the development of technology is of considerable importance (Soslü, Dilber and Düzgün, 2011). Conversely, it is also known that it is essential to benefit from technology during the course of a quality science education (Balliel Ünal, 2017). In other words, it can be maintained that technology and sciences are closely related and support each other. When all these points are taken into consideration, the evaluation of the subject of sciences implemented via distance education, in the light of which essential arrangements can be made, is considered important. Hence, it is hoped that the present research study will serve as a response to the discussions on how distance education should be implemented in specifically the subject of sciences.

When considered overall, this unfavorable condition that is being experienced displays the importance of distance education. However, it is also a fact that an urgent transition to this system necessitates increasing its effectiveness with improvement works. It is clear that this improvement cannot be obtained solely by improvement in the technical infrastructure and Internet facilities. It is believed that works will be more meaningful if they are based on the views of the stakeholders subjected to this system. However, it is observed that while teachers and students have been included in the studies that have been conducted, parents have been neglected. In fact, parents play an important role in distance education by providing their children parental support and the necessary facilities at home. Furthermore, a review of the studies conducted after the onset of the Covid-19 pandemic reveals that mostly tertiary education has been the subject of research (Dikmen and Bahçeci, 2020; Durak, Çankaya and İzmirli, 2020). It is for this very reason that the present study can be claimed to be unique and current. Moreover, it is believed that the study will provide important data for the related literature and the course of distance education, for which improvement works are in process within an education system that undergoes continuous change. The aim of the present research study conducted within this scope was to examine the views of parents regarding the subject of Sciences implemented through distance education by means of the National Ministry of Education during the Covid-19 pandemic.

## 2. Method

### 2.1. Research Design

Of the qualitative research methods, the basic qualitative research model was employed in the present study. In basic qualitative research, how individuals interpret or construct meaning of the research topic within their interactions with their social worlds (Merriam, 2013).

### 2.2. Participants

The participants of the study were the parents of 6th grade students attending a middle school in the Central Anatolian Region of Turkey. The maximum diversity sampling method was utilized for sample selection in the study. Accordingly, the study was conducted with 17 parents of students who possessed different features and were willing to participate in the study. Of the parents of the students, 11 were female and 6 were male. The occupations of the parents ranged between being a housewife, teacher, scientist, nurse, retiree and academician. Figure 1 depicts the code names assigned to the parents, their gender, and their occupations.

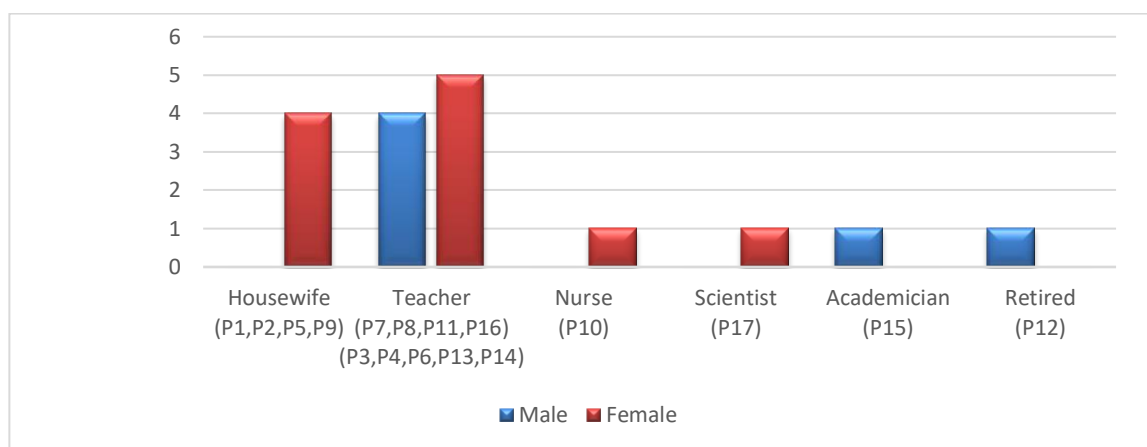


Figure 1: Parents participating in the research

### 2.3. Data Collection Tools

The data of the research were collected by means of semi-structured interviews, one of the qualitative data collection methods. To this end, initially an interview protocol that was appropriate to the aims of the research study and which consisted of open-ended questions was prepared. The prepared protocol was submitted to two experts who held Ph.D. degrees in the areas of science education and instructional technologies for expert opinion. In addition, expert opinion was received from a Turkish language expert. The protocol was finalized after both the domain experts and the language expert decided that the protocol was suitable to be used in the research.

### 2.4. Data Collection

The data of the research were collected by means of semi-structured interviews. Prior to the interviews, the participants were informed about the confidentiality of the data and identity information. Due the pandemic, the interviews were held online on a day and at a time when the parents and researchers were available. Each interview lasted approximately 20 minutes and all the interviews were completed over a period of ten days.

### 2.5. Data Analysis

Before data analysis, preliminary preparations were made in the study. Within this scope, initially the interviews were transcribed, compiled into an MS Word document, and then

checked. Subsequently, each transcription was assigned a number such as P1, P2, P3 etc. Then the analysis process was initiated. The data in the study were subjected to content analysis. Content analysis can be defined as the data being arranged in a meaningful way, and the process of forming categories based on the relationships that explain the data (Yıldırım and Şimşek, 2011). In the present study, the data were analyzed by two researchers. To identify the consistency between the two experts the Miles and Huberman (1994) [Concensus/ (Dissidence + Concensus) x 100] formula was used and the consistency between the cores was calculated as 93%.

## 2.6. Validity and Reliability

To increase the validity of the research, the process of the research has been explained in detail, and the findings have been presented together with direct quotations from participant responses. Furthermore, to ensure internal validity (credibility), two researchers played active roles during all the stages of the research such as the collection of data and data analysis; that is, researcher triangulation was performed (Yıldırım and Şimşek, 2011).

The research process has been explained in detail to ensure transmissibility in these kinds of qualitative studies. To provide evidence for the reliability of the research study, the inter-coder consistency was calculated (93%). In the literature, the inter-coder consistency is recommended to be 80% and above (Patton, 2002; Yıldırım and Şimşek, 2011). Accordingly, it can be stated that the research is reliable.

## 2.7. Limitations

This study, in which the views of parents regarding the implementation of the sciences subject via distance education in middle schools, is limited to 17 parents' views. Moreover, that the Covid-19 pandemic was being experienced while the research was conducted and, hence, this negative situation could have reflected on the responses of the participants should be taken into consideration.

## 3. Findings

### 3.1. The General Views of the Participants regarding their Children's Learning Science at Home via EBA during the Pandemic

The initial question posed to the participants in the study was as follows: "*What do you think about your child's learning science at home via EBA? Could you evaluate it?*" The findings are presented in Table 1.

Table 1. *Learning science at home via EBA*

Category	Parents	Frequency
Useful	P1, P3, P4, P5, P6, P7, P8, P10, P12, P14, P15, P16, P17	13
Partially useful	P2, P6, P9, P12, P16	5
Useless	P11, P13	2

As can be observed in Table 1, the parents generally evaluated learning science via EBA in three categories, *namely useful, partially useful, and useless*. By examining the rate of representativeness of these views, it can be observed that the majority of the participants viewed science instruction via EBA to be sufficient (f=13). Moreover, some parents who found the system to be useful reported insufficient aspects of the system. To illustrate, P9 said, "*I find it useful but insufficient because the duration of the lesson is short...*" Another parent, V16, expressed his/her view by saying, "*It is a useful initiative but difficult for it to be beneficial;*

*for it to be used effectively, teachers need to use information technologies well and students need to be motivated to learn. As a teacher, I have repeatedly witnessed some students opening up EBA and moving away from their computers.”*

There were only two participants who described science instruction via EBA as useless. V11, who reported such a view and was a teacher him/herself, said, *“I don’t find favorable very much. It does not substitute for face-to-face education.”*

### **3.2. The Views of the Participants regarding the Effectiveness of Science Instruction Implemented via EBA during the Pandemic**

The parents who participated in the study were asked the following question: *“Do you think science instruction via EBA is implemented effectively? Are the lessons effective? Why do you think so? Could you please explain?”* They responded to this question as presented in Table 2.

Table 2. *The effectiveness of implementing science instruction via EBA*

Category	Codes	Parents	Frequency
Yes, they are effective.	The visuals and videos are arresting.	P1, P3, P7, P8, P15, P16, P17	7
	There are activities for reinforcement.	P4, P5, P7, P8, P14, P16	6
	It is effective for exam preparation.	P10, P16	2
No, they are not effective.	It is insufficient; it needs to be improved.	P2, P6, P9, P11, P12, P13	6
	The duration of the lessons are short.	P9, P11	2
	It should be based on experiences and experiments.	P6	1
	Feedback is insufficient.	P8	1
	Looking at the screen is unhealthy.	P16	1

It can be observed in Table 2 that the number of participants who viewed science instruction via EBA to be effective is high. The participants justified their views by claiming that the visuals and videos used in EBA were arresting, that there were activities for reinforcement, and that it was effective for exam preparation. However, upon closer examination of the participants’ statements, it can be observed that the participants expressing that the system was effective also mentioned some insufficiencies. For example, one parent, V16, who believed that the system was effective, said, *“I believe that it is effective for exam preparation but when education is under consideration, I don’t think it is suitable for children. Looking at the screen for hours is not easy for children. Such things as animations are effective but it requires students to have a great deal of self-regulation.”*

Based on the figures in Table 2, it can be observed that there is a considerable number of parents who believed that the system was not effective. These participants explained their views by claiming that improvements were needed in EBA, that the duration of the lessons and feedback were insufficient, that the lack of hands-on, experiential learning would not secure permanent learning, and that looking at the screen was unhealthy. To illustrate, P6 expressed his/her views as follows: *“No I don’t think it is effective. Science is not a subject that can be learnt merely through the visual and auditory domains of learning. Science can be taught*

*permanently by hands-on and experiential [learning].*” However, as can be observed in Table 2, the majority of the parents who claimed that the lessons were ineffective merely stated that they expressed their view as such as they did not find education via EBA sufficient and that EBA needed to be improved. Accordingly, it can be deduced that if science instruction implemented via EBA is improved and developed, parents’ views may become positive.

### **3.3. The Views of the Participants regarding the Advantages and Opportunities of Science Instruction Implemented via EBA during the Pandemic**

The participants were asked the following question: *“Does science instruction via EBA have more advantageous aspects than does science education at school? If so, what are they? Why do you think so? Could you please explain?”* In general, the parents reported that they found the presentation visuals and the videos arresting, that it was easier to focus on the TV at home than on the board in the classroom, that students were not afraid to make mistakes, that students realized their own deficiencies more easily thanks to individualized instruction, that the opportunity of repeating the content was an advantage, that they received education in an enjoyable way, and that it contributed to their self-confidence. In addition, there were parents who claimed that experiments could be conducted virtually and in this way students could see the results of their experiments in a more safe environment, and that the contents were quite rich. The response of P4 can be given as an example to these mentioned advantages: *“A more comfortable home environment enables students, who are not afraid to think freely or make mistakes, to gain self-confidence while answering questions.”* Similar views were expressed by P3 as follows: *“Yes, the video presentations are more arresting. Crowded classrooms and the time sacred for each child to talk do not leave time to watch the visuals from time to time. From this aspect, children can find the opportunity to and can focus without losing their attention while watching EBA.”* Another parent, P7, stated, *“It provides students with a both educational and enjoyable learning opportunity. Interactive and animated lesson vides can be given as examples to illustrate this. In addition, the rich educational content, topic inputs, lesson presentations, and the topic and review tests are highly valuable resources for the students.”*

The parents expressed that they generally liked the visuals and videos used in EBA, that education was done in a comfortable environment, and that the lessons were enjoyable and had enriched content. However, while the advantages of EBA were mentioned, there were also comments stating that the duration of the lessons were short. It is believed that by revisiting the issue of lesson durations, one factor casting a shadow on the advantages of science instruction via EBA can be eliminated.

### **3.4. The Views of the Participants regarding the Disadvantages and Obstacles of Science Instruction Implemented via EBA during the Pandemic**

The participant parents’ responses to the following question — *“Does science instruction via EBA have more disadvantageous aspects than does science education at school? If so, what are they? Why do you think so? Could you please explain?”* — were mainly based on the limited possibility of providing corrective feedback. Generally parents stated the deficiencies of the sistem as the difficulty of providing students with corrective feedback regarding any one of their behaviors, the insufficiency of the lesson duration, the limitation of learning through experiments, which are in the nature of science lessons, lack of active participation in the lessons, and the elimination of the possibility of students’ social interaction with each other. In addition, the participants put forward that with the elimination of class discipline, focusing problems could be experienced when there are other distracting situations within the home environment. In relation to this point, P4 expressed his/her view as follows: *“At school rather than self-discipline, there is external classroom teacher control. Every child at home may not be able to engage in regular study. S/he may not be able to focus on his/her lessons. This could*

constitute a disadvantage.” Similarly, P8 said, “It is difficult for the child to pay attention while listening passively to the screen. S/he cannot get immediate feedback to a question that arises in his/her mind. S/he cannot have his/her own idea, example, or the topic-related image that s/he envisions confirmed. S/he lacks the part that s/he can learn through interaction with his/her peers.”

Moreover, some parents emphasized that the conditions of the students varied in terms of gaining benefit from the infrastructure of EBA, and that students should not have any obstacles to benefitting from EBA. To illustrate, P12 expressed his/her views as follows: “Currently our children and the infrastructure system of EBA are not well-matched because not all children have the same opportunities; there isn’t a computer nor Internet in all every child’s home. These problems should first be eliminated and then transition to distance education should be made.” Thus, it can be claimed that P12 has highlighted problems arising from insufficiencies in technical infrastructure and equipment.

Accordingly, to improve EBA further, it will be quite useful to specifically focus on corrective feedback and measurement and assessment, to provide students with tasks and activities related to social interaction and the ability to focus on the lesson, and to ensure that they have equal opportunities in terms of technological equipment.

### 3.5. The Views of the Participants regarding the Effect of Science Instruction Implemented via EBA on Motivation to Learn during the Pandemic

The parents participating in the study were asked the following question: “Do you think science instruction via EBA affects your child’s motivation to learn science? In what way? Why do you think so? Could you please explain?” The findings of the analysis of the parents’ responses are presented in Table 3.

Table 3. *The effect of science instruction via EBA on motivation to learn*

Category	Parents	Frequency
Positive effects	P3, P4, P5, P7, P8, P11, P12, P13, P14, P17	10
Negative effects	P6, P9, P10, P16	4
No effects	P1, P2, P15	3

As can be observed in Table 3, the majority of the parents stated that science instruction via EBA had a positive impact on children’s motivation to learn. To illustrate, P3 said, “I think it can have an effect. In lessons based on the textbook, the subject of Science can remain abstract. But the aspects that become more concrete as it is watched can have a positive touch upon any of the child’s interests.”

P7 said, “Our observations are that it affected the attitude to the subject of Sciences positively because s/he understood that s/he could reinforce what s/he learnt at school on EBA within the Internet environment and realize a more permanent learning.”

P6 stated, “EBA can be useful only if it is used as supplementary education, but if the system of the lesson continues in this way, students’ interest in science will decrease.”

Even though science instruction via EBA had a positive impact on students’ motivation, when parents were asked to compare it with learning science at school, the majority of them stated that they did not see the eagerness and excitement of learning at school. They attributed this to some factors such as the difference between the school teachers and those teaching on EBA, the lack of class discipline on EBA, and the inadequacy of student-student and student-teacher interaction. To illustrate, P12 expressed the following: “In my view, when compared



with EBA, science education at school was better because experiments, observations, discussion with peers, teacher explanations were more effective.” As can be observed, that their students did experiments and observations at school, and interacted with their teachers and friends were considered more valuable than the education they were to receive from EBA.

### 3.6. Parents’ Views Regarding Distance Education After the Pandemic is over

The parents participating in the study were asked the following question: “*Would you like the process of distance education via platforms such as EBA to continue after the pandemic is over? Why?*” The findings that the analysis of the participants’ responses yielded are presented in Table 4.

Table 4. *The desire to use distance education after the pandemic is over*

Category	Parents	Frequency
It could be possible for reinforcement purposes.	P1, P3, P4, P5, P6, P7, P10, P13, P16	9
Yes, I would want it.	P8, P9, P12, P17	4
No, I wouldn’t want it.	P2, P11, P14, P15	4

As can be observed in Table 4, parents hold the view that education via EBA should generally be used for supplementary purposes.

To illustrate, while P7 said, “*I would want the support of digital education networks such as EBA to continue after the pandemic is over, just like it was before the pandemic because long summer holidays do not decrease the permanency of educational learnings,*” P8 expressed the following view: “*Yes, I would like it to continue because there is always the probability that life will come with surprises; children started to manage their own education with this platform. If it continues, even when there are obstacles in the way of education, s/he would be able to manage it on his/her own.*” As can be observed, the parents held the general view that receiving face-to-face education could be more useful for the students, and that such distance education platforms as EBA could be more useful when used for purposes of supplementing the lessons.

## 4. Discussion

The present research study was conducted with the aim of evaluating the views of parents regarding middle school students’ learning of science at home via the EBA platform, prepared by the Turkish National Ministry of Education, during the course of urgent distance education to which an immediate obligatory transition was made with the outbreak of the Covid-19 pandemic. The fundamental finding of this research study is that the parents participating in the study consider science instruction via EBA effective despite a series of deficiencies accompanying it. Consistent with this finding, it was revealed in a study by Yılmaz et. al. (2020) that 83.67% of the parents participating in their study considered the education provided by EBA useful or partially useful. A report prepared to evaluate the distance education which Bahçeşehir University (BAU) the Faculty of Education started to implement with the outbreak of the pandemic also shows parallel findings with those of the present study. In the report, it was indicated that parents’ priority was to have education implemented in the traditional classrooms, but in circumstances when this was not possible, they were pleased with the platform that was used currently. Moreover, the parents in the same study stated that they were in favor of the use of this platform to supplement in-class face-to-face education. In the same report, the students in middle and high school were also asked to make an evaluation of distance education during the pandemic period. The data obtained revealed that middle and high school students found the learning process via distance education beneficial, that they found the

education provided sufficient, and that they wanted to continue some of their lessons in this way (URL-2).

The findings revealed in the present study that EBA is useful, convenient, effective in the process of instruction show consistency with those findings revealed in a study conducted by Timur, Yılmaz and İşseven (2017) with the aim of identifying middle school students' views in relation to EBA. The researchers arrived at the findings that students' aims in accessing EBA out of class time was to review the topics covered in the lessons, to play games, to solve tests and to do the assigned homework. On the other hand, it was determined that during class time, the majority of the students did not find the use of EBA sufficient and attributed this to the Internet connection problems in the school. The experience of the distance education process with the outbreak of the Covid-19 pandemic, that is, the use of EBA out of class time being useful and effective for the children of the parents participating in the related study show consistency with those findings reported by Timur, Yılmaz and İşseven (2017).

Kurtdede Fidan, Erbasan and Kolsuz (2016) examined the views of primary school class teachers in relation to the benefits of EBA, and they revealed that the use of EBA increased students' interests toward and their participation in the lessons. Moreover, they reported findings that the use of EBA facilitated learning, made lessons more enjoyable, made access to information easy, and increased students' attention span. These findings also show parallelism with the views obtained from the parents participating in the present study. Similarly, in a study conducted by Çiftçi, Taşkaya and Alemdar (2013), primary school class teachers were found to hold the view that EBA would add visual elements to learning and make access to learning easy. In another study, carried out to examine the impact of web-based distance education on the students' success in the topic of change of state, it was revealed that distance education had a positive impact on success (Ballıel Ünal, 2017). Furthermore, it was identified that web-based teaching of the topics of force and movement increased middle school students' academic achievements, ensured the permanency of their knowledge, and developed their ability of scientific process (Daşdemir and Doymuş, 2012). In many other studies like these, it was revealed that web-based the process of distance education increased academic achievement (Aktaş, 2013; Kenanoğlu, 2008; Tüysüz and Aydın, 2007).

Another finding revealed in the present study in relation to parents' views regarding science instruction via EBA was that it had disadvantages such as corrective feedback was insufficient, the lesson duration was insufficient, the opportunity to learn by doing experiments, which are in the nature of the subject of science, the lack of active participation in lessons, the disappearance of the opportunity for students to socially interact with each other, and the problem of focusing. In addition, it was indicated that the conditions of all the students being unequal with respect to their benefitting from the EBA infrastructure was an obstacle. In support of this finding, Telli Yamanoto and Altun (2020) report that education is not productive when there are deficiencies such as problems related to equipment, technical infrastructure and Internet access during the course of distance education. In studies conducted with students, these types of problems are reported to be experienced (Hammond et al., 2020; Owusu-Fordjour, Koomson and Hanson, 2020). A similar finding to the view that social interaction was limited in distance education, expressed by the parents participating in the present study, was revealed in a study conducted by Karakuş et al. (2020) with Turkish teacher candidates. An interesting finding regarding the view of parents participating in the present study in relation to the disadvantages of science instruction via EBA was that distance education did not coincide with the nature of the science subject since such practices as experiments were not implemented in distance education. Similar to this finding, in the report prepared by BAU, it was revealed that teachers believed practical lessons would be inefficient in the process of distance education. Likewise, Barış and Çankaya (2016) as well as Özköze, Arı and Çakır

(2013) arrived at the conclusion in their studies that the participants of their studies did not believe that distance education was appropriate for practical lessons. As a matter of fact, this opinion is the product of a bias or the inability to go beyond structures that one is accustomed to because in reality with the rich content off in distance education, it is possible to offer some practical and interactive lessons more effectively than face-to-face education (Bariş and Çankaya, 2016). The points that require careful consideration here is for teachers to be experienced and knowledgeable in integrating technology into educational practices and the software to be rich in content.

In the present study, the views of the parents as regards distance education in the specific subject of Sciences were evaluated and presented above as positive and negative aspects. A similar study was conducted by Özköse, Arı and Çakır (2013) to perform a SWOT analysis of distance education. The strong aspects of distance education reported in the mentioned study of these researchers were that the opportunity it provided students with in terms of learning independent of time and space, its potential to reach out to all students, program diversity, and technical support. The insufficiency of the interaction between students and teachers and theoretical presentations of lessons were found to be the weak aspects of the system. Both studies have common denominators. However, in the present study, the parents did not dwell on distance education providing learning opportunities independent of time and space very much. This could stem from the fact that children are always at home anyway due to the pandemic and that since they are only middle school students, every student may not have a mobile phone, and thus, follows the lessons from the TV.

Another important result that the present study yielded was that the parents participating in the study found face-to-face education at schools more effective but they wanted the use of EBA to be continued as supplementary after the pandemic was over. This result is consistent with the results reported in a study by Yılmaz et al. (2020). These researchers worked with families across Turkey and revealed that a very high percentage of the participants, 92.40%, believed that formal education was more effective than distance education, while 68.52% of the participants believed that when students returned to their schools, distance education should be benefitted from as a means to supplement lessons at schools. In a study by Adnan and Boz (2015), it was observed that the teachers participating in the study were of the belief that in the subject of mathematics, a blended approach, in which the face-to-face learning environment and distance education complement each other, should be used.

The present study arrived at the conclusion that the parents participating in the study were of the view that science instruction via EBA increased students' motivation. This result is in line with that reported in a study by Barış and Çankaya (2016). Just as in the present study, the study by Barış and Çankaya revealed that the participants of the study were of the view that distance education had a positive impact on motivation but stated that there could be problems arising in the area of self-regulation. The increase in students' levels of motivation could be attributed to their belonging to the Z generation, who love technology very much and use it actively.

## **5. Conclusion and Recommendations**

The present research study revealed the views of parents regarding children's learning of the subject of sciences at home via EBA, prepared by MNE, during the urgent distance education to which immediate obligatory transition was made with the outbreak of the Covid-19 pandemic. The general results obtained in the study indicate that the participants hold the following views:

1. The views of the participants are that science instruction via EBA is of benefit to students and that an effective and strong science instruction can be implemented via EBA. Based on this view, even though the use of EBA has increased with the outbreak of the Covid-19 pandemic, it is recommended that after the pandemic is over, the use of EBA should be continued, and experts in the field of content development should continue to work on this platform for it to supplement students' lessons.

2. It was stated that, in the process of science instruction via EBA, visuals and videos used were arresting, that paying attention to the TV at home was easier than paying attention to the board in a classroom, that students' level of self-confidence increased as they were not afraid of making errors, that students realized their own deficiencies more easily thanks to individualized instruction, and that there was the advantage of content review via EBA. In addition, that EBA is an enjoyable platform, that experiments could be done virtually, and thus, students can see their experiment outcomes in a safer environment, and that contents are quite rich are among the advantages of EBA. Thus, it can be understood that the visuals and videos on EBA are highly liked by parents. For this reason, increasing the number of these further and producing them more professionally would increase the opportunity to gain effective and worthwhile benefit from the platform. Adding experiments with simulations and animations into specifically contents of the subject of science would have a positive effect on students' attitude to and interest in EBA. Moreover, by taking into consideration other advantages of EBA, such as content review, it would be worthwhile for students to benefit from this platform at home as supplementary to their face-to-face education at school after the pandemic is over. Parents have also expressed the same view.

3. It was revealed that science instruction via EBA had such disadvantages as the insufficiency of corrective feedback, the inadequacy of the lesson durations, the limited opportunity to learn through experiments, which are in the nature of the science subject, the lack of active student participation in the lessons, the disappearance of students' opportunity to socially interact with each other, and the possibility of creating a problem of focusing. Furthermore, it was stated that the conditions of all the students being unequal in terms of benefiting from the infrastructure of EBA was an obstacle. In light of this finding, the following recommendations can be made: work should be done to eliminate obstacles that can emerge in the hardware or software so that students can benefit from EBA more easily, the duration of the lessons should be increased, experiments should be included by making use of such techniques as simulations and animations, students should be encouraged to conduct experiments at home with simple and inexpensive materials, and a virtual class environment should be established so that there can be interaction between students and teachers. In addition, increasing the question bank and test pools in the content to assess the learning outcomes of students would be of benefit considering the existent understanding of measurement and assessment in the Turkish education system.

4. Science instruction via EBA has generally impacted students' motivation to learn positively. This shows that it would be worthwhile to continue making use of EBA after the pandemic is over. In future studies with students, the impact of instruction via the EBA platform can be revealed more clearly. When face-to-face education resumes, experimental studies can be designed to do comparative analyses.

5. Finally, it has been concluded that after the pandemic is over, it would be more beneficial for the students to receive face-to-face education when compared to distance education, and that such distance education platforms as EBA would be more beneficial when used as supplementary to students' lessons. Thus, improving the EBA platform and its mobile application in terms of content and use could contribute to its rate of usage and its prevalence.

## **6. Conflict of Interest**

The authors declare that there is no conflict of interest.

## **7. Ethics Committee Approval**

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

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