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Evaluation of Graphic Tablet Use in Mathematics Lessons in Emergency Distance Education Process

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Abstract

In the process of the global epidemic Covid-19, radical changes have been experienced in all parts of society. Education is one of the institutions most affected by change. As in the whole world, educational institutions in our country have suspended face-to-face education and have started the distance education process to the extent that the conditions allow. The unpredictable course of the global epidemic prevented institutions from making long-term decisions, and the learning and teaching parties in education tried to adapt to the new situation to a large extent with their own means. In this process, teachers who were on the side of the teacher and used information technologies well adapted to the process more easily, while teachers who could not use it well were the group that felt the most difficult in this process. Some of the teachers, who find themselves in emergency distance education, have been in search of how to be productive in the distance education lessons they will teach. Mathematics teachers, who are the group of teachers who use the traditional board and tools most frequently in face-to-face education, also searched in this process. During the Covid-19 emergency distance education process, writing and drawing type operations with computer mice in mathematics lessons negatively affected the motivation and interest of teachers and students in the lesson. Graphic tablets, which are mostly used for graphic design purposes, have emerged as a result of this search. The ease of use and the fact that it can be used on computers and mobile devices have caused teachers to prefer this technology in distance education classes. In this study, the evaluation of the use of graphic tablets in mathematics lessons in the emergency distance education process and the evaluation of the use of graphic tablets in distance education lessons to be held for any reason in the future were made. In the study carried out in the context of the qualitative approach, the data were collected with a semi-structured questionnaire prepared by the researchers by making purposeful sampling from 18 mathematics teachers who used graphic tablets in primary school mathematics lessons during the Covid-19 emergency distance education period. The obtained data were analyzed with content and descriptive analysis methods. Results such as making mathematical operations easier, writing lessons effectively, lecturing and using it as a blackboard, mostly for the purpose of solving questions, were obtained regarding the graphic tablet. In general, it has been understood that the limitations and difficulties encountered in the use of the graphic tablet are very few.

Keywords: Distance education, Covid-19, graphic drawing tablet, mathematics education

1. Introduction

Covid-19 disease, which was included in the pandemic category by the World Health Organization, first started in December 2019 in Wuhan, China's Hubei province (Tesini, 2020). In addition to the negative effects of the Covid-19 epidemic, which has been expressed as the most important health problem worldwide in recent years, on public health, it has also been effective in issues such as democracy, internal security, the structure of the state and public policies (Orçun and Ayhan, 2020). One of the most important and radical decisions taken for public order and health was to take a break from face-to-face education and switch to distance education. According to

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the UNESCO report; 1.6 billion students in 191 countries have been severely affected by the temporary closure of educational institutions (UNESCO, 2020).

This long struggle with the global epidemic has negatively affected the education sector, like many other sectors. In this process, while face-to-face education was suspended in schools around the world, different solutions were created in order to continue education. Following the date of March 11, when the first case was seen in Turkey, it was announced that face-to-face education was suspended in educational institutions, as a result of the increase in cases, as a result of the pandemic experienced all over the world on March 23, 2020, face-to-face education was stopped and instead it was decided to continue with online education (Özdogan and Berkant, 2020).

With the development of technology, distance education has emerged as a field that can be reached to larger masses compared to previous years, and where effective and permanent education can be made, which increases the motivation and interest of learners thanks to the digital materials used. Distance Learning; It is expressed as a system where learning and teaching activities are carried out by bringing education services to more people, bringing together learners and instructors in different places and creating equal opportunities (Yalın, 2001; Gelişli, 2015). UNESCO states that preparations should be made in technological, content, pedagogical and monitoring-evaluation issues in order to ensure that distance education offers quality and equal education opportunities for all (UNESCO, 2020). In this context, it is an important requirement to create quality education environments that provide equal opportunities for everyone while conducting distance education activities. While carrying out emergency distance education activities, some negativities were encountered in all levels and branches of education. The lack of social and individual interaction and the inability to reach the teacher are among these difficulties (Tryon & Bishop, 2009; İşman, 2011). The high initial setup cost of distance education systems (Bolliger & Wasilik, 2009), problems in accessing the internet (İşman, 2011) are the disadvantages of distance education that are frequently expressed. While conducting distance education activities in Turkey and around the world, we encounter four main problems. These are, respectively, economic problems, social problems, accessibility and quality of the distance education provided.

In the distance education process, there have been many educational problems in all disciplines that are a part of distance education. There have been cases where the innovations brought by technology in terms of making the learner active and motivating in the course are insufficient. This situation has been encountered especially in disciplines involving mathematics and mathematical operations. It has been stated by some researchers that distance education environments cannot provide the necessary supportive tools for discussion and problem solving in educational environments that include mathematics and mathematical operations (Myers et al., 2004; Smith & Ferguson, 2004).

Today, in distance education, technological tools, software and documents that will support the teacher in every sense and provide the learner's motivation and permanent learning are increasing rapidly. One of these technologies is graphic drawing tablets. Graphic drawing tablets can be used in all areas of education and positive results can be obtained in terms of the quality and efficiency of education. According to the data obtained in a research on graphic drawing tablets; The common view of teachers and students about graphic drawing tablets is that they are suitable for use in all lessons (Akçayır & Kılıç Çakmak, 2017). Graphic drawing tablets can be used effectively especially in numeric-weighted courses. Because the math lesson consists of many formulas, shapes and functions. When the literature is examined, it is emphasized that drawing shapes in different colors, making markings on texts, have positive results for the mathematics course, which is a numerical course, and increase student motivation (Galligan et al., 2010). One of the most important situations in distance education is the low participation and motivation of the students in the course. This negativity can be eliminated by increasing the interaction within the course. According to the students, only audio narration in the lesson causes the lesson to be boring. Because for distance education to be effective and efficient, the course should be as interactive as possible (Oviatt et al., 2000). Graphic drawing tablets, which will establish a bond between the learner and the teacher in educational tools such as z-book, pdf and zoom used in distance education mathematics lessons, and which will enable the teacher to contact the student in some way, have taken an important place in the distance education of the mathematics course during the Covid-19 pandemic period. It is an easy technology to install and use graphic drawing tablet on computers. It is a hardware that allows the user to write or draw by hand. Graphic drawing tablets offer the user the opportunity to draw easily, thanks to their digital pen. What is done to the screen of the tablet is also seen on the computer screen simultaneously. Today, graphic drawing tablets are used to make lessons more effective. Graphic drawing tablets in distance education enabled educators to use handwriting while conveying the course contents and question-solving methods to students, and with the help of their features, communication between the student and the teacher emerged (Loch & McDonald, 2007).

In this study, the views and experiences of distance education mathematics teachers regarding the use of graphic drawing tablets in mathematics lessons during the Covid-19 pandemic period were investigated. Based on their experiences during the Covid-19 period, the reflections of the graphic drawing tablets they used in distance education on mathematics teaching were examined. At the time of this study, the negative effects of the Covid-19 epidemic continued, and the lessons were conducted as hybrids from time to time in line with the quarantine

conditions. This situation has been maintained for a long time as one of the measures implemented in schools in order to avoid the negative effects of the pandemic in different countries of the world as well as in our country. This situation has made the use of graphic drawing tablet a necessity as a specific technology at the point of showing and performing mathematical operations in the distance education process. In this context, it is necessary to investigate the use cases of graphic drawing tablets used in mathematics lessons conducted in distance education environments during the pandemic period, and to reveal their reflections on the teaching process. This study is important in terms of getting better efficiency from the graphic drawing tablets used in distance education mathematics courses, revealing the difficulties and problems of in-class use and the opportunities it provides in the context of learning. In this context, the aim of the research is to evaluate the reflections of the use of graphic drawing tablets in mathematics lessons on the teaching process in the emergency distance education process that emerged with the Covid-19 pandemic and to make suggestions for the future. In this context, the research seeks answers to the following questions:

1. What are the reasons for using graphic drawing tablets in mathematics lessons conducted in virtual classroom environment?
2. What are the educational opportunities provided by the use of graphic drawing tablets in mathematics lessons conducted in virtual classroom environment?
3. What are the difficulties and limitations that arise during the use of graphic drawing tablets in mathematics lessons conducted in the virtual classroom environment?
4. What are the suggestions for maintaining and using graphic tablet after distance education?

2. Method

2.1 Research Method

This research, which examines the use of graphic drawing tablets in mathematics lessons in virtual classroom environments, was conducted based on a qualitative approach. Qualitative research is concerned with constructing the meaning that emerges as a result of an event. Basic qualitative research is concerned with the interpretation of these meanings that people create. Basic qualitative research reveals and examines the meanings created by people with research questions (Merriam, 2013). In this study, the reflections of the graphic drawing tablets used in the mathematics lessons carried out in the emergency distance education process on the teaching activities were taken online with a semi-structured questionnaire. The obtained data were analyzed with content analysis and descriptive analysis techniques in the context of research questions.

2.2 Research Group

This research was conducted with 18 mathematics teachers who used graphic drawing tablets in secondary school mathematics lessons during the Covid-19 epidemic period. The mathematics teachers participating in the research were determined by the criterion sampling method, one of the purposive sampling methods. Criterion sampling, which is one of the purposive sampling types, is the determination of the participants according to the criteria previously determined by the researcher (Yıldırım & Şimşek, 2016). Participants are secondary school mathematics teachers who had to conduct their lessons with distance education for more than a year with the Zoom virtual classroom application in line with the regulations and measures of the Ministry of National Education during the emergency distance education process. The main feature of the participants is that they include graphic drawing tablets in the mathematics lessons in the emergency distance education process in line with their own experiences, possibilities and preferences. Demographic information about the participant group from which the data were taken within the scope of the research is presented in Table 1.

Table 1. Demographic Characteristics of Participating Teachers

Variable (N=18)		f	%
Gender	Woman	7	39
	Male	11	61
Seniority Year	4-8 years	8	44
	9-14 years	2	11th
	15 Years and above	8	44
Where You Work	District	8	44
	City Center	9	50
	Rural	1	6
Education level	Licence	13	72
	Degree	5	28
Where You Conduct Distance Education	House	17	94

	School	1	6
Internet Package Used	Fiber	13	72
	Adsl	5	28
	Mobile	1	6
Information Technologies In-Service Training	Yes	4	22
	No	14	78

2.3 Data Collection Tools

In this study, a semi-structured questionnaire was used as a data collection tool. Semi-structured interview technique stands out as a more suitable technique for educational science research due to the standardization in its structure and flexibility in time. In semi-structured interviews, the researcher prepares the questions he/she intends to ask in advance. In this type of interview, the researcher asks the questions he has prepared in accordance with the flow of the interview and may ask for explanations about his answers when necessary (Bogdan & Biklen, 2007). The first draft form was created in the context of research questions by scanning the relevant literature. In order to ensure the validity of the questionnaire in the context of the relevant subject, the questions were rearranged in line with the opinions of academicians who are experts in the field of information technologies and mathematics education. The prepared form was read to two different mathematics teachers and the clarity of the questions was checked. The form prepared in this study was presented to the designated teachers online via Google Forms. The teachers were informed that the data obtained would not be used outside of the research and that the necessary ethical rules would be followed. Filling the form was done on a voluntary basis by the teachers. Any questions (school, age, branch, etc.) that could reveal the identities of the teachers participating in the survey were not included, thus it was tried to provide the teachers with the opportunity to give sincere and sincere answers.

2.4 Analysis of Data

The data collected with Google form in the online environment were first analyzed with content analysis in the context of research questions. The first step codes were made from the answers given by the teachers to the questions, and then the codes related to each other were collected under the themes determined in accordance with the theoretical structure of the research. Content analysis is the systematic analysis of printed or visual materials in terms of certain categories. The data obtained through content analysis were classified between each other and certain themes, thus revealing the relationships between the data (Yıldırım & Şimşek, 2011). Content analysis focuses on the origins of the phenomenon or event. The concepts revealed by the coding and the data and how these concepts are related are analyzed. It is in an effort to find the themes related to the problem from the descriptive and detailed data collected in qualitative research, to transform the obtained data into meaningful and systematic structures, to form a theory based on these data or to provide a theory. By coding the data, the concepts underlying the data and the relationships between the concepts were revealed. The findings obtained through content analysis in the research were supported by the findings obtained through descriptive analysis. The MAXQDA qualitative data analysis program was used in the analysis of the data obtained qualitatively, and the relationship between the code and the themes was provided to be revealed more clearly.

2.5 Validity and Reliability

Validity and reliability are expressed with numerically calculated values in quantitative studies. However, in qualitative research, validity and reliability cannot be expressed with numerical values. For this reason, validity and reliability are handled in different ways in qualitative research, and sometimes even with different names (Noble & Smith, 2015; Shenton, 2004). When the literature is examined, the concept of persuasiveness for qualitative research emerges. In qualitative research, we come across various strategies to ensure this credibility. In qualitative research, it is stated that four evaluations, namely credibility, transferability, consistency and impartiality, should be taken into account in order to ensure credibility, which is used instead of validity and reliability (Guba, 1981).

To ensure credibility in this study; Volunteering was taken as a basis in the selected participants and before the application of the interview form, necessary information was given to the participants about the purpose of the research and the questions in the interview form. In addition, the confirmation of the participants was provided as the interview forms were filled by the participants themselves. In order to ensure the transferability of the study, participants who teach distance education mathematics at all levels of education and use graphic tablets were selected. In addition, the characteristics of the participants who participated in the interview in the study were given in detail.

The biggest limitation of this study is the inability to generalize to the population by making use of the findings obtained due to the small number of participants in qualitative studies. Another limitation is to move away from the flexibility of face-to-face interviews, which occur because the interview is not conducted face-to-face with the participant.

3. Findings

The effect of the use of the graphic drawing tablet on the mathematics teaching process in the secondary school mathematics lessons conducted in virtual classroom environments during the emergency distance education process and the limitations and difficulties arising in the process due to the use of the graphic drawing tablet were analyzed and presented in parallel with the research questions. In this process, the data obtained with the semi-structured questionnaire form from the participating mathematics teachers were analyzed with the content analysis method with the help of the MAXQDA qualitative data analysis program, and the findings were also tried to be explained with the help of the findings obtained by the descriptive analysis method.

When the data collected from the participant group were examined, it was seen that the purpose of including the graphic drawing tablet in the mathematics lessons conducted in the virtual classroom environment differed. The aims of incorporating the graphic drawing tablet into mathematics lessons in the emergency distance education process by the mathematics teachers are summarized in Figure 1.

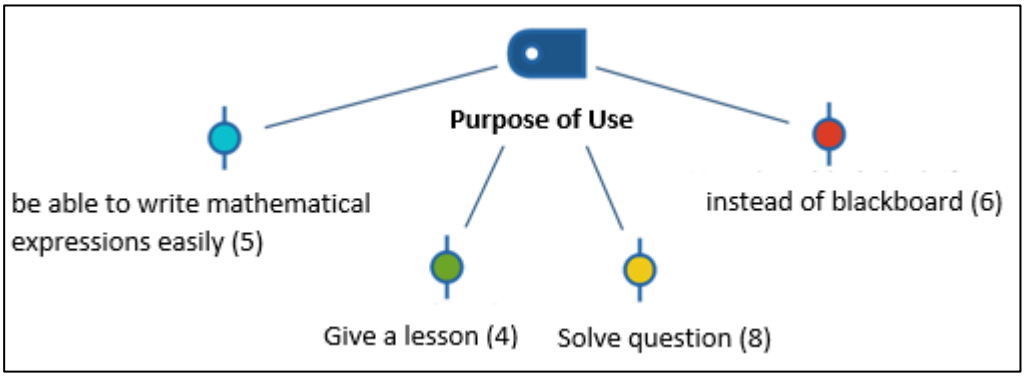

Figure 1. The purpose of using the graphic drawing tablet in mathematics lessons

When Figure 1 is examined, it is understood that the common purpose of mathematics teachers to include the graphic drawing tablet in the teaching process is to solve questions in the lesson. This is followed by using the graphic drawing tablet with the whiteboard function. It is understood that another purpose that mathematics teachers frequently express is to perform mathematical operations more easily and to make the lesson more effective. When the objectives expressed by the mathematics teachers are examined, it can be stated that the determined objectives aim to make the mathematics lesson in the virtual environment more productive for the students. The sample expression for the purposes of using the graphic drawing tablet in the online mathematics lessons conducted by the teachers in the emergency distance education process is as follows:

> *"...I used it to improve processing skills, to increase the efficiency of the course and to use time more effectively (T12)".*
>
> *"...I used it to be able to write more easily and legibly, to draw shapes more beautifully and quickly (T17)".*

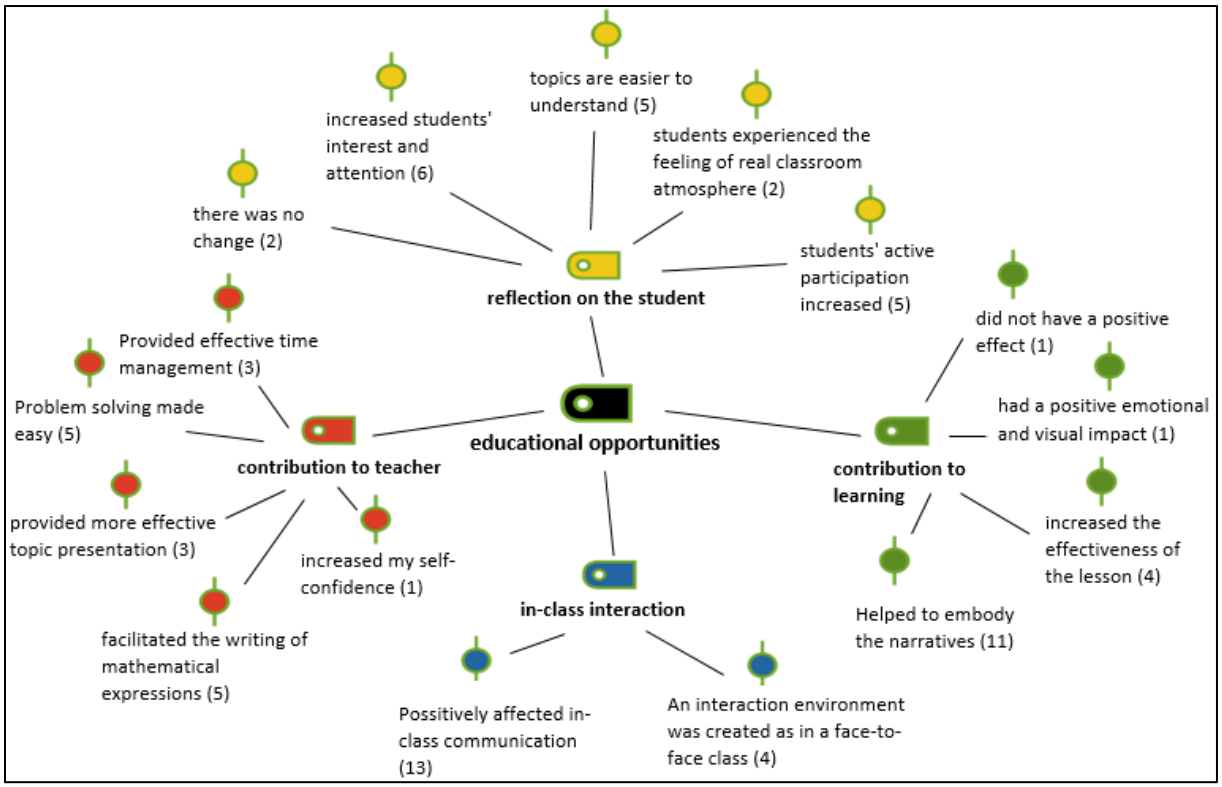

Figure 2. Educational advantages of using a graphic drawing tablet

When Figure 2 is examined, it has been determined that the inclusion of the graphic drawing tablet in the mathematics lessons in the virtual classroom environment in the emergency distance education process contributes to the emergence of educational opportunities for the teaching process. When the opinions of the mathematics teachers were examined, it was seen that the student, teacher, learning and interaction dimensions of the educational opportunities that emerged with the use of graphic drawing tablets came to the fore.

When the opportunities created by the use of graphic drawing tablets are examined in terms of students; It is understood that the interest and attention of the students' increase, it contributes to the feeling of a real classroom environment, the active participation of the students in the lesson increases, and the students understand the lesson more easily thanks to mathematical operations and graphic drawings. However, two of the participating teachers stated that the use of graphic drawing tablets did not contribute to any change in students' perception and attitude towards the lesson. Sample teacher views on the educational opportunities provided by the use of graphic drawing tablets in online mathematics lessons are as follows:

> *"...enabled the participation in the lesson, increased the participation in the lesson and the lesson positively (T7)".*
>
> *"... helped them understand better while solving questions (T10)".*
>
> *"... Mathematics is a lesson that requires playing with a pencil. It helped me a lot in this respect with the graphic tablet. Students felt themselves in the classroom environment. They paid more attention to the lesson (T15)".*
>
> *"...I do not think that it attracted their attention and made a change in their attitudes (T6)".*

can be summarized as using time effectively, activating lesson presentation, facilitating problem solving, and providing comfort in writing mathematical operations and drawings. In addition, one teacher stated that her self-confidence in teaching mathematics in a virtual environment increased with the use of a graphic drawing tablet. Sample teacher views on the educational opportunities provided by the use of graphic drawing tablets in online mathematics lessons are as follows:

> *"...when I wasn't using a graphic tablet, my wrist ached and I was having trouble typing. Also, what I wrote was not very clear. The use of Graphic Tablets solved all my problems (T6)".*
>
> *"...first of all, it instilled self-confidence in my lecture. It enabled me to teach my students more efficiently in this process (T7)".*
>
> *"...it allowed me to draw on the questions (T12)".*

"...it made distance education more efficient by enabling me to easily solve questions on the screen and solve many questions with my students (T15)".

When the educational opportunities that emerged in the learning dimension were examined, it was seen that the majority of the participating teachers stated that the graphic drawing tablet contributed to the easier understanding of the students by embodying the narratives. In addition, it is understood that it contributes positively to the more efficient teaching of the lesson. On the other hand, one participant stated that he could not observe any positive side of using a graphic drawing tablet in the mathematics lessons he taught. Sample teacher views on the educational opportunities provided by the use of graphic drawing tablets in the online mathematics lessons are as follows:

"... if there was not a graphic tablet, the stories would have remained in the air (T3)".
"...I think it contributes positively to students' understanding as it makes what I write and solve more legible and also facilitates geometric figure drawings (T6)".
"...it was very effective in the question-solving phase, it was especially effective in marking and writing where geometrical attention should be drawn (T14)".

When the views of the participant teachers on the effects of using the graphic drawing tablet on the in-class interaction dimension were examined, it was seen that all expressions were positive. 13 participants stated that the use of graphic drawing tablets had a positive effect on in-class interaction, while four participants stated that an interaction environment similar to the classroom environment was created. The participant teachers' views on this situation are as follows:

"...for making the lecture more practical and interactive. It provided better and more effective communication (T2)".
"... at first, the lesson progressed with video and PowerPoint presentations, then the lesson was taught with a graphic tablet just like in a classroom environment. Student activated. He started to ask more questions by getting more rights to speak (T15)".

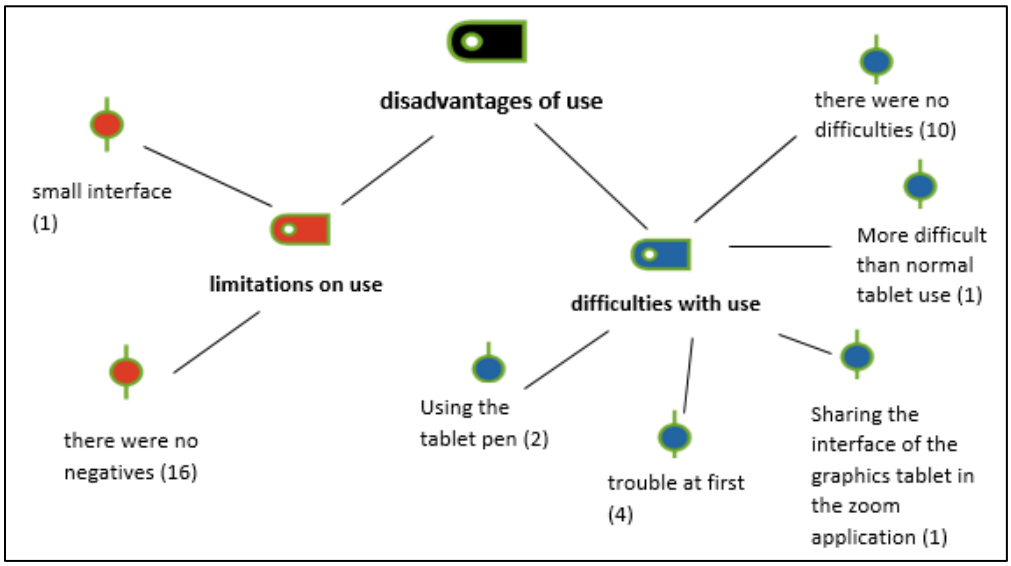

Figure 3. Disadvantages of using a graphic drawing tablet

When Figure 3 is examined, it is understood that there is not a very important limitation for the use of graphic drawing tablets in mathematics lessons in the virtual classroom environment during the emergency distance education process. However, it was observed that only one participant expressed a negative opinion about the small screen size of the graphic drawing tablet. On the other hand, when the difficulties related to the use of the graphic drawing tablet are examined, it is understood that although the majority of the participants stated that they did not have difficulty, some of them had difficulties in using the pen and sharing in the virtual environment. The sample statements of the participating teachers in the context of the negative aspects of the use of the graphic drawing tablet are as follows:

"...It took time for me to adapt to his pen at first (T7)".

"...at first, I had difficulty in providing hand and eye coordination (T14)".
"...I was never challenged. It seemed to me as if I had been using it for years (T15)".

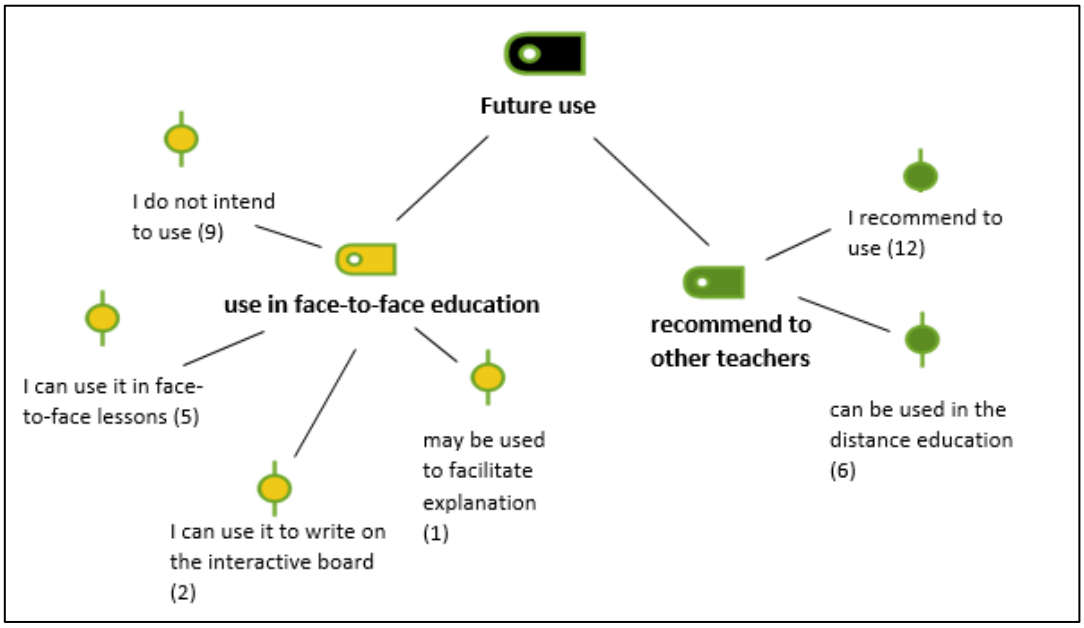

Figure 4. Continuity of graphic drawing tablet use

When Figure 4 is examined, it is understood that the majority of the participating teachers do not intend to use the graphic drawing tablet, which they have experienced in the virtual classroom environment, in face-to-face classroom environments. However, the opinions of eight participants that they can use the graphic drawing tablet in face-to-face environments came to the fore. While the views of the teachers regarding the use of the graphic drawing tablet in face-to-face education environments were divided into two groups, it was determined that they made suggestions to their colleagues to use it. However, six of the teachers who made suggestions limited it to numerical courses to be conducted in a distance education environment. The sample expressions of the participating teachers regarding this situation are as follows:

"...I plan to use it in my lectures and presentations as it provides fast and practical use (T8)".
"... yes, I intend to use it while drawing (T10)".
"... I don't plan to use it for now. But maybe in the future I can buy a better graphic tablet and make educational designs (T15)".
"...It should be the top priority tool to be used in the virtual classroom environment (T3)".
"...I have recommended it to a few friends so far. It makes it very easy to write and draw shapes. What we write is quite legible and I can write very quickly (T6)".
"...I especially recommend it to numeracy teachers. Because I became my hand and foot in distance mathematics education (T15)".

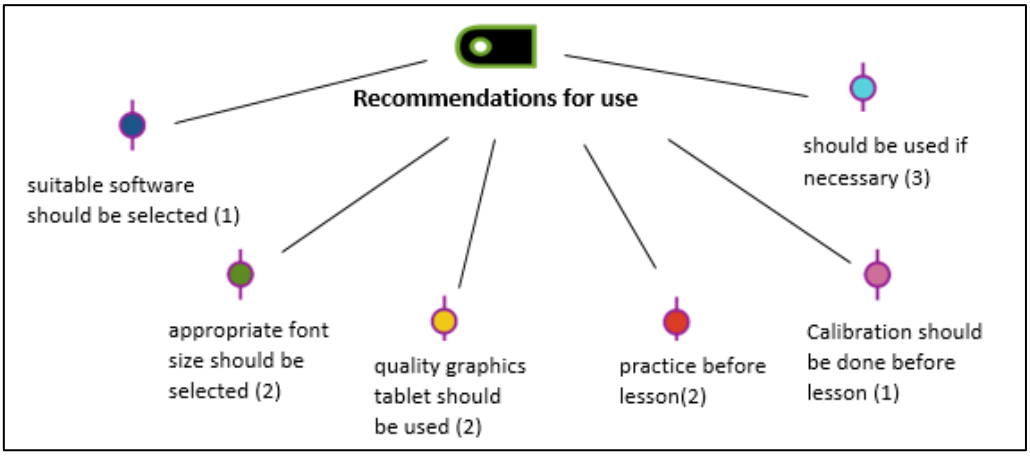

Figure 5. Recommendations for the use of the graphic drawing tablet

On the other hand, the participating teachers made suggestions about the points that should be considered during the use of the graphic drawing tablet. When Figure 5 is examined, these suggestions are; It is seen that it is enough to practice before using it in the lesson, to use quality drawing tablets, to use appropriate font size, to choose appropriate software, to make calibration adjustments. Sample participant teacher opinions on this subject are as follows:

"...the technical features of the graphic tablet should be good (T2)".

"...it should be practiced at first and learned all the features thoroughly, and then it should be used in live lessons (T6)".

"...it is necessary to master its use in the first stage. Experience is necessary to ensure hand and eye coordination (T14)".

"...for us to use the screen regularly, graphic tablet settings should be done well (T15)"

4. Discussion and Conclusion

In this study, it is aimed to evaluate the effects of the graphic tablet on the mathematics lessons held during the Covid-19 Emergency Distance Education period, the purposes of use, difficulties and limitations in the context of teachers' opinions.

Question-answer method emerges as an indispensable method in disciplines containing numerical knowledge such as mathematics. The question-answer method is a technique that is frequently used by educators and is generally useful in the application of other teaching methods. It is solving a problem, writing and explaining what you have written step by step. Asking questions is the first step of the communication between the teacher and the students (Yelken, Akay, 2015). In the context of mathematics lesson, students need to see the solution step by step in order to comprehend the solutions of their mathematical problems (Loch & Donovan, 2006). However, it is stated by many researchers that distance education environments do not offer the necessary tools for discussion and problem solving in mathematics-based disciplines (Myers et al., 2004; Smith & Ferguson, 2004). In line with the findings, it was concluded that the teachers were able to handle the question-answer activities that they had the most difficulty with in distance education lessons with the help of graphic tablets, more efficiently, and that the students could see the process for the solution of the questions step by step. Akçayır and Kılıç Çakmak (2017), in their study on the graphic tablet, concluded that the use of graphic tablets facilitated students' individual note-taking processes as well as allowing students to see the steps of mathematical operations instantly. In this context, it can be stated that there is a positive similarity between the two studies. In addition, as a result of the same study (Akçayır & Kılıç Çakmak, 2017), the main usage purposes of the teachers were determined in this study, such as teaching a lesson, teaching the lesson effectively and writing. These results can be interpreted that graphic drawing tablets are preferred by mathematics teachers in virtual teaching environments to overcome the negative reflections related to visualization and create an opportunity to easily transfer their experience of the traditional blackboard they use in face-to-face classroom environments to the virtual environment.

Another of the most important results that emerged in line with the sub-problems of the research is that the use of graphic tablets creates educational opportunities for the teaching process in the context of mathematics lessons conducted in virtual environment. Considering the reflection of the educational opportunities observed during the research process on the students, it has been concluded that it is an effective tool for the lack of interest, loss of motivation and misunderstanding that are often expressed in distance education. Motivation is of great importance for distance learning. In the literature, it is emphasized that students feel lonely when they are not sufficiently motivated in the distance education process, their learning interest and motivation decrease over time, and they actually interrupt learning due to developing dissatisfaction (Deimann & Bastians, 2010; Huett et al., 2008). According to Akçayır and Kılıç Çakmak (2017), graphic tablets, which are an easy-to-use technology, provide motivation, interaction, visuality, etc. in distance education, especially in lessons such as mathematics. It has the potential to be a solution to prominent problems such as When considered in terms of contribution to learning, the benefit of graphic tablets in terms of teaching mathematical operations and concepts to students comes to the fore. Graphic tablets also increase the efficiency of the lesson, and it has been seen that they have positive reflections in terms of contributing to the students both emotionally and visually. In face-to-face education, mathematical concepts and operations are transformed into concepts that students can associate with daily life with materials that help concretization. However, the limitations arising from the environment, competence and materials in the distance education process make this situation even more difficult. The findings can be interpreted as graphic tablets partially reduce this observed negative situation. Primary school students need materials and representations that they can interact with and experience in order to comprehend abstract concepts (Piaget, 1971). It is stated in many studies that the materials used to associate and concretize mathematics with daily life contribute positively to students' motivation, desire to participate in the lesson and their success (Byoung, 2001; Birgin & Tutak, 2006). Considering the educational opportunities that emerged in this study; It can be stated that the use of graphic tablets

contributes to the effective use of the teacher's time, to the students by easily performing the drawings and demonstrations of the mathematical operations, to reflect the students, to follow the process steps as in the traditional blackboard, and to make sense of the process. In the distance education process, when the teacher feels comfortable and self-confident, he can be more beneficial to his students in line with the goals and objectives of the course (Coşkun Şimşek, İnam, Yebrem Özdamar, & Turanlı, 2022). According to Coşkun Şimşek et al., (2022), graphic tablets, which are easy to use, provide motivation, interaction, visuality, etc. in distance education, especially in lessons such as mathematics. It has the potential to be a solution to prominent deficiencies such as In the related study, it is emphasized that teachers and students are satisfied with the use of graphic tablets in distance mathematics lessons and that graphic tablets positively affect interaction and communication in distance education. In this context, it can be stated that the results obtained in this study have similarities with different studies conducted in the literature.

The limitations and difficulties associated with the use of remote graphics tablets were also investigated in the study. It has been concluded that the limitations expressed due to the use of the graphic tablet are negligible. This situation can be related to the proficiency of the teachers who use graphic tablets regarding the use of technology, as well as the simplicity of the basic functions of graphic tablets. However, it can be stated that among the difficulties encountered are the sharing of the drawings on the graphic tablet in the zoom application and the calibration of the digital pen. However, it has been understood that these difficulties, which were encountered at the beginning, were overcome by the teachers over time.

Finally, the use of graphic tablets in mathematics lessons after distance education of the participants and their suggestions were investigated. Although some of the teachers had positive opinions about using the graphic tablet after distance education and recommending it to colleagues, it was concluded that most of them did not plan to use it when they returned to the classroom environment. When the transition process from face-to-face education to distance education is examined, it has been observed that instructors encounter different processes and roles in distance education practices (Dabbagh & Bannan-Ritland, 2005; Gülbahar, 2021). The methods and techniques used by the instructors in distance and face-to-face teaching differ. The lesson plan, the execution of the lesson process and many educational activities to be done differ. In this context, it can be interpreted that teachers do not have the knowledge and experience about how and in which process of education they can use graphic tablets in face-to-face education. Or, it can be stated that teachers do not need to use technology other than the traditional blackboard in terms of performing and reflecting mathematical operations in the real classroom environment in the context of the learning environment. It has been understood that it is very important to use quality graphics tablets, to practice enough before using them in the lesson, to perform pen calibration, to experience the processes for sharing what is written in the virtual environment, and these factors will limit the problems that may arise due to the use of graphics tablets during the lesson (Candaş, Ersoy, & Değer, 2022). In addition, it can be stated that planning the stage and how to use the graphic tablet during the distance lesson will prevent the negative situations that may be encountered in the classroom management during the lesson.

5. Suggestions

This study was conducted with teachers working in distance education mathematics courses during the emergency distance education process.

When we look at the findings obtained as the purpose of using the graphic tablet in mathematics lessons, it has been seen that it can have a common use with many disciplines such as writing, solving questions and lecturing. It can be stated that the use of graphic tablets in virtual lessons, which contain numerical information, require drawing and where problem-solving activities are carried out, will make a positive contribution to achieving educational outputs.

Although it is understood that the disadvantages regarding the use of graphic tablets are quite limited, teachers who will use graphic tablets should examine this technology before the lesson, give sample lectures, and integrate it with the virtual classroom application they will use, which will prevent potential live broadcast problems.

After the distance education, it was understood that most of the participant group did not think of using the graphic tablet again. This situation can also be interpreted as the need to improve teachers' awareness and competencies regarding the use and integration of technology in the teaching process. For this reason, trainings can be organized for mathematics teachers in the context of the use of graphic tablets and similar technologies for educational purposes.

This study, which was carried out in the context of the mathematics lesson, can be repeated in other lessons that we can express numerically.

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