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Examination of Classroom Teacher's Experiences Regarding Mathematics Courses Taught through Distance Education throughout the COVID-19 Pandemic Period

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Abstract

The aim of this study is to investigate the experiences of teachers regarding online primary school mathematics courses throughout the pandemic period. In this respect, the teachers were examined about the efficiency of distance education during the course sessions, the activities that involve the student, its positive and negative aspects, the utilized materials, portals, websites, the situation of students embodying the concepts, the extent to which they maintained the assessment, the difficulties they encountered within the process, as well as their suggestions. In the study, it was seen that teachers had both positive and negative views on distance education. The participant teachers in the study utilized different portals and websites throughout the distance education process. The majority of those teachers had the opinion that the methods used in mathematics courses through distance education assisted students in learning the concrete concepts. In the study, suggestions were made to enhance the efficiency of the mathematics courses along with distance education.

Keywords: Distance Education, Mathematic Courses, 21st-Century Skills, COVID-19 Pandemic

1. Introduction

Coronavirus (COVID-19), which emerged in Wuhan, the capital of the Hubei region of China on December 1, 2019, has caused quite crucial changes and impacts on health, education, economy, and social life all around the world, and the World Health Organization (WHO, 2020) declared a global pandemic on March 11, 2020. The first infection case in Turkey was announced by the Ministry of Health on March 11, 2020, and it had significant impacts in various fields, including education. The impact of the COVID-19 pandemic on education has been worldwide and almost entire schools and universities have been closed down in the hope of reducing the risk of infection.

Education is the most fundamental phenomenon that shapes the future of countries and enables people's mental development. Conventional education cannot offer equal opportunities and facilities to everyone due to adverse

conditions in geographical, cultural, and economic terms. By courtesy of distance education, these limitations are eliminated to a large extent. Distance education has been one of the systems that would contribute to lifelong learning so that society may keep up with the ever-changing and developing world (Özbay, 2015). Distance education is an education system in which learners are located far from each other as well as learning resources in the context of time and space. The aim of distance education is to conduct educational activities without being affected by time and space utilizing the developing technology, upon mitigating the time and geographical barriers that cause the disruption of education.

Bozkurt (2020), who interpreted the pandemic as a storm, stated that after the storm, one's perspective on education and the way one would perceive education might have changed. Along with the altered perspective, concepts such as flexible working hours, working at home, and distance education have entered everyone's daily lives. Due to the pandemic, education has been maintained remotely, not face-to-face. Distance education has significant advantages, especially in comparison to face-to-face education. Distance education provides a large number of audiences with access to information regardless of time and place limitations. It provides diversity and flexibility to educational processes, reduces training costs, and offers a flexible and objective assessment and evaluation (Elitaş & Devran, 2017). Also, distance education is an educational method that provides learners with the opportunity of education by using printed, audio-visual and electronic materials when there are no other means of education due to various reasons such as age, illness, geographical distance, family situations, time, and money shortages (Demiray, 1999). Distance education, which is carried out more widely due to pandemic conditions, also contains certain disadvantages. The most important problem for distance education is the decrease in student motivation due to the lack of face-to-face interaction. When the students interact with their teachers, what is meant to be expressed would be better understood. In distance education, the teacher needs to make much more effort for the students to attend and continue the course sessions (Gürer, Tekinarslan, & Yavuzalp, 2016). Moreover, distance education may cause the learner to become asocial due to the lack of group study discipline and the lack of interaction. It may fall short in teaching the courses or subjects that require practice. There may be a risk of technology addiction and reliability of measurement and evaluation (Demiray, 1999).

Mathematics is a branch of science that is, in a certain order, founded on concepts and operations within logical integrity. What is expected from students in mathematics education is to figure out the order specified in this branch of science, discover, and make sense of it. The fact that students study mathematics is associated with their ability to enjoy mathematics and express sympathy and a positive attitude towards mathematics. Mathematics courses given in elementary schools are of great importance in order to impose the mentioned behaviors (Yaşar and Papatğa, 2015). The education system in Turkey aims at raising individuals who have the knowledge, skills, and behaviors integrated into competencies. Competencies, which are the required skill of the students' personal, social, academic, and business lives at both national and international levels, have been determined in the Turkish Qualifications Framework (TQF). It is seen that one of the competency titles in the TQF, which is categorized into eight items, is "Mathematical Competence and Competence in Science/Technology," and another title is "Digital Competence" (MoE, 2018).

Mathematical competence and core competencies in science/technology: Mathematical competence is the development and practice of mathematical thinking to solve a range of problems encountered in daily life. The process, activity, and knowledge built on a solid arithmetic skill are emphasized. Mathematical competence includes the ability and willingness to use mathematical modes of thinking and presentation to different degrees.

Digital competence: It involves the safe and critical use of information and communication technologies for business, daily life, and communication. Such competence is supported through basic skills such as using computers for accessing and assessing, storing, producing, presenting, and exchanging information, as well as participating in common networks and communicating via the internet (MoE, 2018).

It is essential that technology is integrated with mathematics courses depending on the determined competencies. Educators need to determine how to render technological capabilities compatible with good mathematics teaching upon form the course content (Cullen, Hertel, & Nickels, 2020). It is seen that the teaching of mathematics through distance education has been transferred to a different dimension due to the pandemic conditions.

Although mathematics is a course that students have difficulty with, it may be overcome with the help of teachers and effective learning activities be developed. Successful communication techniques are thought to be among the means of teaching the mathematics course through the distance education system with success and productivity. The role and importance of the teacher, who generates suitable learning environments for students through the distance education system, in which the students are at the center, has increased even more during this pandemic process that shook the world. The characteristics of teachers, who have a role of guiding students, such as facilitating the learning processes through distance education, their perspectives on distance education, and their experience of teaching with distance education affect the efficiency of the education process (Harris and Krousgill, 2008). Teachers need to maintain the distance education process, over which they do not have as much control as face-to-face education. Therefore, it is crucial to determine teachers' perspectives on distance education and develop suggestions in compliance with the findings obtained in order to maintain the distance education process effectively and efficiently (Balaman & Hanbay Tiryaki, 2021).

Recently, many studies have been conducted to examine the opinions of teachers, as well as teacher candidates and academicians, regarding online courses. Başaran, Doğan, Karaoğlu, and Şahin (2020) stated that distance education was beneficial in order for teachers not to disrupt training during the COVID-19 pandemic process, but it should have been developed and improved in terms of infrastructure, content, material, and inequality of opportunity. Individuals who are unfamiliar with technology had difficulties throughout the distance education process. Can (2020) stated in his study that both teachers and students were insufficient in utilizing information technologies. Metin, Gürbey, and Çevik (2021) stated that teachers experienced difficulties especially in maintaining classroom control, communicating effectively with students, increasing students' motivation towards the courses, and ensuring students' participation in the course sessions. Besides, it was observed that both students and teachers were inadequately equipped in terms of their ability to use technological instruments and software during distance education. It was found that some teachers had positive opinions on distance education as well as emphasizing problems such as network problems, education, and awareness (Arora and Srinivasan, 2020). More students were not satisfied with the education (Hebebe, Bertiz, & Alan, 2020; Gillies, 2008). Wang, Stein, and Shen (2021) indicated that teachers could have paid more attention to the following dimensions to improve students' learning experience: making macro-level comments on courses, designing instructional methods, providing formative feedback for homework and discussions, and making full use of technological tools in teaching.

Although there are studies in the literature aiming at determining the attitudes or experiences of students, teachers, and instructors towards distance education, these studies are mostly based on undergraduate and graduate students (Karakuş, Cheapsatar, Karacaoğlu, Esendemir & Bayraktar, 2020; Duban & Şen, 2020; Kırtak, 2020; Duzgun and Sulak, 2020). There is a limited number of studies examining the opinions of primary school teachers on the mathematics courses they lectured during the pandemic period. Batdal Karaduman, Akşak Ertaş, and Duran Baytar (2021) stated in their study that classroom teachers thought that the mathematics studies conducted within the distance education process would have contributed to the students, and the feedback from the parents regarding the process was, in general, positive. Classroom teachers, who stated that no contribution was made to the students, emphasized not being able to receive feedback from the students, insufficient equipment, and technical problems. Aldon, Cusi, Schacht, and Swidan (2021), in their study on teachers from different branches, came across findings such as lack of interaction of classroom teachers with students during the pandemic, parents' prominence, increased student responsibility, and teachers' stress due to lack of time. Kalogeropoulos, Roche, Russo, Vats, and Russo (2021) indicated that both teachers were concerned about effectively catering for all students and assessing student progress as well as engagement with the tasks. Survey data revealed that most students exhibited positive engagement with remote learning experiences, except for the lack of opportunity to learn mathematics with and from their peers.

The aim of this study is to examine the experiences of teachers regarding elementary school-level mathematics courses through distance education. In this regard, it was tried to reveal the teachers' efficiency during the course sessions, their attitudes, the activities that involve the students in, the materials and websites they use, the situations of the students embodying the concepts, the extent to which they perform the assessments, the difficulties and suggestions experienced in throughout the process.

2. Methodology

In the research, a case study, one of the qualitative research patterns, was used in order to obtain information about teacher experiences of primary school level mathematics courses conducted through distance education. The case study is a qualitative research approach in which the researchers examine one or more limited situations over time with data collection tools (observations, interviews, audio-visuals, documents, reports) that includes multiple sources, and define situations and themes depending on the situation (Creswell, 2007). The case study provides an in-depth analysis of events. Therefore, the employment of the case study research design is deemed appropriate in this study.

2.1 Study Group

Classroom teachers constitute the participants of the research study, a total of 10 teachers (9 female and 1 male) selected by purposive random sampling method. Purposive random sampling is the purposeful classification of systematic and randomly selected case samples in compliance with the purpose of the research study (Marshall & Rossman, 2014). The researcher first determines a sample group out of the population employing random methods and then selects a small subgroup from this group that is thought to contribute the most to the research study (Tashakkori & Teddlie, 2010). Purposive sampling enables the selection of cases with abundant information for in-depth studies (Patton, 2002). Voluntary participants of the study consist of 10 classroom teachers (9 female and 1 male).

2.2 Data Collection Tools

The data are collected by the researcher via semi-structured interview forms. Upon preparing the interview forms, firstly, the existing literature on the subject is reviewed. A question pool, from which the question lists are selected, is generated to be used in the research study. A draft interview form is prepared. Opinions of expert academicians in their fields regarding the interview form are taken into account. Interviews are conducted with 5 teachers, a pilot application of the interview form is conducted and the clarity of the questions is tested. Expert opinions, the results of the pilot interviews, necessary checks, and formal arrangements are made and the interview form is finalized. The semi-structured interview form prepared to determine the distance education experiences of teachers during the COVID-19 epidemic process consists of 11 open-ended questions.

Appointments were made for 10 classroom teachers who accepted to participate in the interview. Interviews were held via Zoom Video Conferencing Platform in May 2021. The interviews, which lasted approximately 45 minutes for each teacher, were recorded. During the interviews, attention was paid not to guide the participants and any intervention that would have caused them to change their opinions was avoided. Following those interviews, the responses of the teachers were transcribed and deciphered. Besides, to ensure the reliability of the research, the same questions were asked to each teacher, and only volunteering teachers were included in the study. The consistency between the answers given by the participants was checked and the results of the research were shared with the teachers participating in the study.

2.3 Data Analysis

The obtained data are evaluated employing the content analysis method. Content analysis is the interpretation of the study conducted by generating different themes regarding the phenomenon or event and determining codes under these themes. In other words, it is the systematic review of printed or visual materials and thematic analysis in terms of certain categories (Yıldırım & Şimşek, 2011). The data obtained through the content analysis are classified between each other and certain themes, thus revealing the relationships among the data. From another perspective, content analysis is the task of recognizing the patterns of similar themes, such as recurring texts, in qualitative analysis, and revealing these previously unknown patterns with an inductive approach (Patton, 2002). During the data analysis process, all the data obtained from the interview forms and the notes taken during the interviews are revealed. The data are carefully read by the researcher, and first of all, codes are constituted. Themes

are generated by examining the codes. The generated codes and themes are examined and compared, the data are re-examined, and subsequently, the codes and themes are finalized. Then, the generated codes and themes are checked so that the reliability of the research is tried to be enhanced. Frequency values of the opinions of the participants are determined and quotations from the responses given by the participants of the research are presented in the relevant places.

For confirmability, the entire analysis process has been conducted one month again after analyzing the obtained qualitative data. Miles and Huberman's (1994) coding reliability coefficient, which is found to be 0.92, is utilized by the encoder to calculate internal consistency.

3. Findings

In this part, the opinions of the classroom teachers regarding the mathematics courses held online during the pandemic period are investigated. The obtained findings are presented in tables. Classroom teachers participating in the study are encoded such as T1, T2, T3, ..., T22, and T23.

3.1. An examination of the positive and negative aspects of distance education regarding the conducted mathematics courses

As a result of the semi-structured interviews with the classroom teachers, all of the participants stated both positive and negative statements about the mathematics courses. In Table 1, the positive aspects of distance education are presented for the mathematics courses conducted during the pandemic period.

Table 1: Teachers' opinions on the positive aspects of education in mathematics courses taught through distance education

Positive aspects	Number	Interviewees
Increasing interest of students in mathematics courses	6	T3, T4, T5, T6, T8, T10
Conducting group study more convenient and organized through portals (Teams, meeting rooms, Zoom, Google Classroom)	3	T4, T6, T10
More comfortable use of materials such as figures, graphics, pictures, blackboards	2	T3, T8
Attaining easy access to applications serving multiple learning theory	1	T5

According to Table 1, 6 teachers state that the interest of students in mathematics has increased. One of these teachers, T3, makes the following statement: "*As children get more active in the chat section, their interest has increased even more. It takes us a great deal of time when we write down a figure, graphic or a problem in our normal classrooms, whereas the process progresses quickly in distance education.*" 3 teachers state that group study is more comfortable. 2 teachers mention that materials such as graphics and figures are used more easily in distance education. One of the teachers states that there are more easy-to-use platforms that would help multiple learning in online applications.

Table 2: Teachers' views on the negative aspects of education in mathematics courses taught through distance education

Negative aspects	Number	Interviewers
The plan prepared for the course does not progress in the desired direction.	8	T1, T2, T5, T6, T7, T8, T9, T10
Easily distracted students and having trouble concentrating	5	T1, T2, T3, T5, T8
Students experiencing technical problems in using computers and being inadequate in distance education	4	T2, T6, T7, T8
Experiencing problems in teaching abstract mathematics concepts	3	T1, T7, T9
Low level of participation in mathematics courses	3	T2, T3, T5
Encountering problems in measuring and assessing students' achievements	3	T5, T8, T9
Difficulties in receiving feedback from students	2	T7, T9
Ambiguity in understanding whether students listen to the teacher	1	T5
Having problems with technological self-confidence	1	T5
Learning by touching is out of the question	1	T1
Low level of using Web 2.0 tools by students	1	T10

In Table 2, the negative aspects of distance education, in general, are presented by considering the responses of the teachers obtained in the study. According to this table, the most negative statement is that the plan and schedule of the course do not progress in the desired direction (8 Teachers). 5 teachers mention that students get distracted quickly during the mathematics course sessions and they have problems in attracting students' attention to the course. 4 teachers mention that students have problems using computers. It is also stated that students who have not received any training in distance education have problems in this regard. 3 teachers state that they had problems in measuring and assessing the mathematics courses. 3 teachers state that they have problems in teaching abstract concepts. Among these teachers, T1 claims that *"There are difficulties in terms of receiving feedback in distance education. Since they are in the concrete operational period, they learn kinesthetically, and we cannot achieve this through distance education."*

2 teachers mention that they have difficulties in receiving feedback from the students.

One of the teachers mentions the problem of self-confidence in distance education. T5 makes the following statement: *"I have the problem of technological self-confidence in distance education, I am an active teacher, I cannot move physically in distance education, I cannot check my notebooks, merely talking on the screen is against my comprehension of teaching."*

3.2. Methods, techniques, and strategies used by primary school teachers in mathematics courses

Table 3: Methods, techniques, and strategies used in mathematics course sessions along with distance education practices

Methods, techniques, and strategies	Number	Teachers
Game-based Teaching	5	T2, T6, T7, T8, T9
Realistic Mathematics Teaching	4	T1, T2, T4, T5
Collaborative Learning	4	T6, T7, T9, T10
Q & A	2	T2, T8
Experiment-based Teaching	1	T1
Drama-based Teaching	1	T1
Problem-based Learning	1	T8

The methods, techniques, and strategies used by the classroom teachers in the mathematics course sessions along with the distance education applications are presented in Table 3. 5 teachers state that they utilize it in game-based teaching classes. Teachers state that they utilize various digital games such as adventure games, sports games,

strategy games, and puzzle games during their mathematics teaching. T6's statement on this matter is as follows: "We will hold a contest through games instead of saying 'let's solve problems now,' but I remind the students that a game exists here, I explain how the students should behave even if they are defeated, then I encourage them to collect the most points by responding to very good questions in the game they play." 4 teachers employ the realistic mathematics teaching method in their course sessions with computer support. On this subject, T8 makes the following explanation: "We thought about what we can buy for breakfast on an online shopping site, we determined the amount together with the students, we decided how much we need, and we also talked about weight here, for instance, they used their multiplication and addition skills such as 1 kg of cucumber and 2 kg of tomatoes, then I wanted them to make a salad with their families and I wanted the students to choose the salad ingredients first at the market, to determine the amount themselves and to calculate the amount, at the same time, I wanted them to make comparisons. I try to conduct activities during which they can use mathematics in daily life as if 1 kg of tomato is comprised of 5 pieces." One teacher states that he/she uses drama and experiments in their course sessions. This teacher makes the following explanation: "Children cannot sit in front of the computer for long hours due to their ages. Since I am a dancer myself, I use a lot of activities such as drama and dancing which both aim at expending students' energy and attracting their attention that day, especially in introductory activities on that subject."

3.3. Activities used by classroom teachers to enhance the efficiency of mathematics course sessions

In Table 4, the activities conducted by teachers to enhance students' participation in mathematics courses and to enable them to take an active role in the classroom are presented in Table 4.

Table 4: Studies that involve students in mathematics courses through distance education and their reasons

<i>Activities</i>	<i>Reasons</i>	<i>f</i>	<i>Teachers</i>
Virtual applications	Many practices that cannot be performed in the physical classroom environment can be conducted comfortably in the virtual environment and attract the attention of the students.	6	T3, T8, T9, T5, T4, T6
Game	Making the course session much more fun, attracting more interest in the classroom, especially in younger age groups	5	T2, T4, T7, T8, T9
Group studies	Increased interest in the course sessions when students study together	3	T1, T6, T9
Examples of concrete experiences	Since certain subjects are associated with real-life, examples and animations related to real-life enable students to participate more in the course sessions.	3	T1, T7, T10
Homeworks	Include homework in order to enhance students' participation in the course and render learning permanent.	3	T4, T6, T7, T9
Q & A	Frequently asked questions to students enable them to become more active in the classroom.	2	T2, T8

Upon examining Table 4, 6 teachers state that they enabled students to become active during the course sessions by utilizing virtual applications. These practices enhance students' interest in the course and participation in the classroom. 5 teachers state that using games in mathematics courses enables students to become effective in the course sessions. T1, T6, and T9 state that they conduct group studies; T1, T7, and T10 state that they use examples from concrete experiences; T2 and T8 state that they utilize Q&A; whereas T4, T6, T7, and T9 utilize homework and activities that involve students in mathematics courses. Working together during group study increases the interest and participation in the classroom, with examples from concrete experiences, overcoming the screen difficulty, and real-life experiences enhance the excitement of the students and their willingness to participate in

the course, the students comprehend the subject better by animating with the scenario, and learn by having fun, especially in the younger age groups. It is stated by the teachers that the activities that cannot be carried out in the classroom can be conducted easily using virtual applications and that the interest in the course may be enhanced by rendering learning permanent through homework.

3.4. Materials used by classroom teachers in mathematics courses

The materials used by the teachers in the distance education mathematics courses are presented in Table 5.

Table 5: Materials used by teachers in mathematics courses through distance education

<i>Code</i>	<i>f</i>	<i>Teachers</i>
Accessible Materials (Paper, cardboard, ruler, colored pencils, play dough, ...)	6	T1, T5, T7, T8, T9, T10
Social content	4	T3, T5, T9, T10
Ready materials (Tangram, Fraction cards, symmetry mirror,...)	2	T2, T6
Reference books	1	T4

Upon examining Table 5, it is stated that T1, T5, T7, T8, T9, and T10 used materials such as paper, cardboard, ruler, and play dough to concretize mathematical concepts in their course sessions. Teachers state that they prepare models that could help to understand the concept by utilizing these materials in distance education. T3, T5, T9, and T10 state that they utilize ready-made materials such as social content (Word Wall, Morpa Campus, Flip grid videos, games, Bitmoji classes, Carnins app); whereas T2 and T6 utilize tangram, fraction cards, and symmetry mirror unit cubes in their course sessions. It is observed that T4 prefers to use reference books.

3.5. Websites/educational applications that classroom teachers use in their mathematics courses

The websites/educational applications used by the teachers in the mathematics courses taught through distance education are presented in Table 6.

Table 6: Websites/educational applications used in mathematics courses through distance education and their frequency of usage

<i>Code</i>	<i>f</i>	<i>Teachers</i>
Word Wall	8	T2, T3, T4, T5, T6, T8, T9, T10
Learning Apps	3	T6, T9, T10
Z Book	2	T2, T5
Morpa Campus	2	T2, T9
Eğitici Uygulamalar	2	T4, T5
Web 2.0 tools	2	T6, T10
Kahoot	2	T6, T7
Google Classroom	2	T6, T9
Okulistik	1	T2
Ata Publication	1	T3
Gregtangmath.com	1	T8
Bitmoji Classrooms	1	T10
Padlet	1	T10

Upon examining Table 6, it is seen that 8 teachers (T1, T2, T3, T4, T5, T6, T8, and T9) utilize Word Wall; 3 teachers (T6, T9, and T10) use Learning App; T2 and T5 use Z Book; T2 and T9 use Morpa Campus; T4 and T5

use Educational Applications; T6 and T10 utilize Web 2.0 tools; whereas T10 uses Bitmoji Classes and Padlet. It is determined that T1 rarely utilizes websites/educational applications, while other teachers frequently utilize them.

3.6. Evaluation techniques used by classroom teachers in mathematics courses

Table 7: Types of assessment in the mathematics course lectured through distance education

Assessment Types	Number	Teachers
Classical written exams	4	T1, T3, T9, T10
Questions during the course session	3	T2, T4, T5
Homeworks	2	T2, T6
Assessment through games	1	T8
Multiple choice tests prepared by nin hazırladığı çoktan seçmeli testler ile	1	T3
Assessment tools on Eba platform	1	T4
Web 2.0 tools	1	T10
Google clasroom	1	T7

Table 7 presents the assessment process of teachers in mathematics courses through distance education applications, where T1, T3, T9, and T10 prefer the classical exams prepared by themselves; T2, T4, and T5 prefer questions to the students during the course sessions; T2 and T6 prefer homework; T3 prefers multiple-choice questions prepared by him/herself; T4 prefers the assessment tools on Eba platform; T7 prefers the assessment activities in the Google classroom; T8 prefers assessments through the game played during the course sessions; whereas T10 prefers Web 0.2 tools.

3.7. Difficulties experienced by classroom teachers in mathematics course sessions

Table 8: Difficulties experienced by teachers in mathematics courses through distance education

Experienced difficulties	Number	Teachers
Difficulties in access to the Internet	6	T2, T3, T4, T5, T6, T7
Difficulties in teaching abstract concepts	3	T6, T7, T9
Lack of digital competence	1	T3, T10
Difficulties in finding materials	1	T7

As a result of the interviews held with the classroom teachers, the difficulties experienced by the teachers in the mathematics courses taught through distance education are presented in Table 8. According to the table, T2, T3, T4, T5, T6, and T7 state that they experience internet access problems. T6, T7, and T9 assert that they have problems in concretizing abstract mathematical concepts, in preparing or finding appropriate online content. T3 and T10 claim that their digital competencies are low. T7 has problems in finding and preparing materials online.

3.8. Classroom teachers' suggestions for enhancing the quality of mathematics courses

Table 9: Teachers' suggestions for increasing the quality of the mathematics courses conducted through distance education

Solution suggestions	Number	Teachers
Offering training on distance education and digital competence to teacher candidates in education faculties	3	T1, T3, T4
Access to more online games should be provided	2	T2, T5
More materials should be utilized	2	T4, T7
Motivational reinforcers should be used	1	T6
There should be more fruitful content on the Eba platform	1	T8
Seminars should be held on the introduction and utilization of Web 2.0 tools	1	T3
Guidance should be provided for the utilization of mind and intelligence games in the course sessions.	1	T7
Teachers and students should be provided with media literacy education	1	T9

Visual content should be used even more	1	T10
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In the research study, the participating teachers make various suggestions for the mathematics course through distance education. In Table 9, as a result of the analysis of the interviews held with the classroom teachers, the suggestions of the teachers to enhance the quality of the mathematics courses carried out through distance education are presented. Here, 3 teachers assert that teacher candidates should be provided with digital competence and distance education in their faculties. The opinions of the teachers regarding the suggestions are presented below.

T1: "Since prospective classroom teachers have not received any training about distance education in their faculties, they are unprepared in this process and encounter various problems when all of the courses are scheduled for distance education. Before starting teaching, training on distance education and digital competence can be included in the curriculum for teacher candidates in education faculties."

T2: "Students have more enjoyment and active participation in teaching through games in mathematics courses taught through distance education, the efficiency of the courses can be enhanced by using more online games in online mathematics courses."

T9: "Student is not aware of the fact that courses are taught online as in the school environment, they are not aware that they have to attend the online courses on time, they are not aware that they should be seated and keep their notebooks open as in the classroom environment. Therefore, teachers and students should be provided with media literacy training as soon as possible."

3.9. Comprehension of the concepts in mathematics courses

Table 10: Comprehension of the concepts in mathematics courses through distance education

Theme	Yes	No	Indecisive
Concretizing the concepts	8 (T1, T2, T3, T4, T6, T8, T9, T10)	1 (T5)	1 (T7)
Helping in learning the concepts	7 (T1, T3, T4, T6, T8, T9, T10)	2 (T2, T5)	1 (T7)

Upon examining Table 10, 8 teachers (T1, T2, T3, T4, T6, T8, T9, and T10) state that students could concretize mathematical concepts through distance mathematics courses, whereas merely T5 claims that students could not concretize the concepts. T7 states that he/she could not measure the courses since the courses are taught through distance education. T5 asserts that since the students are within the concrete operations stage, they cannot measure in the courses taught through distance education in the teaching of abstract concepts and be productive. When the teachers are asked whether the students tend to learn mathematical concepts through distance education courses, T1, T3, T4, T6, T7, T8, T9, and T10 assert that students learn the concepts; T2 and T5 state that students do not learn the concepts; whereas T7 is indecisive. T2 reports that students are unable to learn since the number of participants in distance education courses is quite low and there is no follow-up to the courses; T5 claims that students cannot reach the equipment required for distance education, there is a lack of infrastructure, they cannot create the necessary environment for teaching; whereas T7 asserts that he/she is not sure whether or not the students could learn since teachers could not deal with the students one-on-one.

3.8. Attitudes of classroom teachers towards mathematics courses

Table 11: Attitudes of teachers towards the mathematics courses carried out through the distance education application

Attitude	Reasons	Number	Teachers
I feel comfortable	Effective use of Web 2.0 tools in classrooms and their adaptation to mathematical concepts	3	T4, T6, T8
	Students are not distracted due to the absence of adverse situations such as noise during online course sessions.	2	T4, T7
	Practical use of visuals that would attract the attention of students within the online environment	2	T1, T9

	Students get accustomed to the process	2	T9, T10
	Enhancing digital competencies and adapting to technology	1	T1
I do not feel comfortable	Lack of accurate measurement and assessment	2	T3, T7
	The student does not respond to my questions even though he/she appears in the classroom (Student does not participate in the course session)	2	T2, T3
	Some students cannot attend course sessions due to infrastructural, internet, hardware, and family reasons.	1	T5
	Failure to check students' notebooks	1	T8
	Difficulty in finding online content pertinent to the concept	1	T1
	Problems arising from the use of technology and most of the online platforms are in English	1	T10

According to Table 11; T4, T6, and T8 stated that they utilized Web 2.0 tools effectively, keeping students' attention intact and using such tools effectively for mathematical concepts. T4 and T7 claimed that they taught more comfortably due to the absence of noisy environments during online sessions. T1 and T9 state that they are content with the fact that there are a lot of visuals that would attract the attention of students in online environments. T9 and T10 claim that students get used to the online process.

In addition to all these, T3 and T7 feel inadequate in measuring students' achievements in mathematics. In this regard, T3 states that "*I have an inadequacy in measuring, I cannot have an idea about the fact that all students learn the subject well.*" T2 and T3 observe that some students appear in the classroom, but do not respond to the questions asked. They state that they feel uncomfortable with this situation. T5 asserted that some students are unhappy that they do not attend the courses due to the lack of technological infrastructure. T1 claims that teachers have difficulty in finding online content, and T8 states that they cannot check the drawings and notebooks of the students. T10 expresses that he/she feels inadequate about the technology use and that he/she has difficulties in using the applications because they are in English.

The reasoning of the two teachers who do not feel comfortable involves the fact that not all of the students can attend the course sessions due to the absence of internet access and computers, and that they do not measure and assess the extent to which their students learn correctly.

4. Conclusion, Discussion, and Suggestions

Following the outbreak of the Coronavirus epidemic, which was eventually declared as a pandemic, changes have occurred in all areas and new trends have emerged. In the field of education, which was directly affected by this change, face-to-face education was suspended due to the pandemic, and education was initiated through distance education. Nonetheless, such a sudden transition has caused restlessness in all teachers. However, the circumstances and the developing world conditions have placed distance education at the center of our lives. Therefore, there is a need for assessments pertinent to the functioning of the system. In this sense, teachers' opinions on distance education are crucial. Within the scope of the study, the opinions of the classroom teachers on their experiences in the mathematics course sessions conducted through distance education throughout the pandemic period are examined and their experiences regarding the distance education process are tried to be interpreted. In this part of the study, the results obtained in accordance with the data analyses based on the opinions of the classroom teachers are presented.

During the pandemic period, one of the positive opinions of the classroom teachers regarding the online mathematics courses is the increase in the interest and motivation of their students towards the course. The computer-based methods used in the online mathematics courses may have attracted the attention of the students.

Moreno-Guerrero, Aznar-Díaz, Cáceres-Reche, Alonso-García (2020) obtained a result similar to that of the study. Teachers state that group studies were carried out more comfortably and efficiently over the portals in the mathematics courses. Azita Binti, Intan Shariena Binti, Ea Suk (2019) stated that the distance learning portal had a quite high level of usability and the use of the portal could have significantly improved students' achievement in distance subjects. The learning portal can help provide learning materials that combine different types of media such as texts, animations, graphics, audio, and video to retain students' attention on the course and enhance their success levels. In the study, it is seen that materials such as figures, graphics, pictures, and blackboards have been used more easily in the online environment.

One of the negative aspects of distance education in the study is that the schedule prepared for the courses could not be conducted effectively. It is stated by the teachers that the attention of the children sitting in front of the computer has been distracted quite quickly. Similar findings have also been expressed by Sadeghi (2019), Dhull (2017), and Nazarlou (2013). This may be due to the fact that students have not been provided with a good enough education and students have stood in front of the computer for a long time. Students were likely to experience technical problems during the distance education process. This situation posed plenty of problems for teachers. Alsaaty, Carter, Abrahams, and Alshameri (2016) came across such a finding in their study. Mathematical concepts consist of abstract concepts. In elementary schools, students are required to concretize abstract concepts. One of the difficulties experienced by teachers in the study involves the problem of concretizing abstract concepts. Accurately planned materials to be used in the classroom during face-to-face education are effective for concretization. Nevertheless, there may be problems in utilizing such materials during online education. In online teaching, there may be doubts about whether or not students follow the course sessions. This situation is expressed by a teacher in the study. Friedman, Rodriguez & McComb (2001) stated that the academic achievement of the students who attended the course sessions regularly and who are active in the classroom was high.

One of the most common teaching techniques used by classroom teachers in mathematics courses is game-based teaching. This may be attributed to the fact that elementary school students love games due to their age. Teachers have utilized digital games in their course sessions by associating them with mathematical concepts. Various studies have proven the benefits of game-based learning or digital game-based learning (Kurkovsky, 2013). The practice of game-based learning may cause students to become more enthusiastic and motivated to learn. Along with games, students are also more likely to be enthusiastic and active in learning.

Another teaching method that teachers use in their classrooms is realistic mathematics teaching. The teacher's presentation of more significant materials to the students with a realistic mathematical approach and concretization of the concepts play an important role in the employment of this method. Teachers who can prepare materials that help concretize abstract mathematical concepts and prepare educational films may also utilize these materials in virtual meeting applications such as Zoom Meeting and Google Meet. Drijvers (2015) indicated that the realistic mathematics teaching approach supported the requirements for effective digital learning resources, enabling them to develop constructive learning activities. In the study, it is comprehended that teachers used the online collaborative learning method in their classrooms. In this method, which provides the formation of knowledge under the guidance of the teacher, the students studied together in coordination. Ünal, Özdiñç (2019) stated that the learning environment designed in the online environment, using technology and collaborating, improved pre-service teachers' ability to use technology in their professional lives and to design and develop the teaching materials required by the learning-teaching process.

The teachers participating in the study used virtual applications, games, group study, activities associated with real-life, activities such as homework, and Q&A in their course sessions in order to enable the students to take an active role in the online mathematics teaching process. All these activities are based on effective communication between the student and the teacher. It is essential to use fruitful communication channels to improve the social existence between the student and the classroom content (Kelly & Westerman, 2016).

The teachers used accessible concretized materials, social contents, ready-made materials, and a reference book in the mathematics course sessions conducted with the distance education method. It is seen that the teachers utilize a variety of materials. These materials can be effective in the formation of abstract mathematical concepts.

Özdemir Bakive Çelik (2021) observed that at the secondary school level, the teachers utilized all the resources, similar to this study, and also used materials such as whiteboards, graphic tablets, and smart notebooks.

During the pandemic period, teachers used a wide variety of websites and educational applications in their mathematics course sessions. The majority of the teachers who participated in the study utilized the Word Wall software. Applications such as learning apps, Z book, Morpha Campus, Web 2.0 tools, Kahoot, Google Classroom, Okulistik, Gregtannmath.com, Bitmoji classes, and Padlet have also been utilized by teachers in their course sessions. Albelbisi & Yusop (2019) and Irfan, Kusumaningrum, Yulia & Widodo (2020) reported that the majority of these applications have been utilized by the teachers.

Classroom teachers who participated in the study have used a wide variety of assessment methods to evaluate student achievement in mathematics courses. These include the classical written examinations, asking questions during the course sessions, homework, the games played during the course, multiple-choice tests, evaluation content in the Eba platform, Web 2.0 tools, and Google Classroom. Batmaz, Cevahir Batmaz, and Kılıç (2021) stated that classroom teachers made assessments in the Life Science course through Q&A, textbook activities, homework, Eba platform, educational platforms, and students' participation in the course process.

Throughout the distance education process, the difficulties encountered by teachers in mathematics courses include internet access problems, problems in teaching abstract concepts, digital competence, and problems in finding materials. There are few studies in the literature stating the difficulties encountered by classroom teachers in mathematics courses. Özüdoğru (2021) mentioned problems such as internet access problems and digital incompetence. Avcı and Akdeniz (2021) defined the difficulties experienced by teachers during online courses as technological infrastructure problems, students' lack of concentration and attendance, insufficient support from parents, teachers' digital inadequacies, and teachers' lack of experience. Batmaz et al. (2021) found that teachers encountered various problems regarding the teaching of Life Sciences during the pandemic process but especially faced the problems of not being able to use concretized materials due to insufficient internet access opportunities.

In order to solve the problems encountered in the distance education process and to enhance the quality of the course sessions, the teachers made suggestions such as scheduling seminars on the use of digital technology, providing more access to online games, using more materials in the course sessions, using motivating reinforcers, and having more visual contents. Demir and Özdaş (2020) asserted in their study that teachers made various suggestions concerning the distance education system, such as strengthening the EBA infrastructure and providing teachers and students with infrastructure support. Duman (2020) stated that it would be more effective to maintain face-to-face education concurrently with distance education. Educational programs should include more information about pandemics, parents should be included in the process, and students should receive high-speed internet access (Yıldırım, 2021). Similar findings are obtained in the study.

Suggestions made in compliance with the results of the research study are presented below:

Teachers and students should be provided with detailed information about distance education. Computer-based materials should be prepared to help the concepts become concretized in mathematics teaching, and teachers should be trained on how to utilize these materials. Each student's internet infrastructure and technologies such as computers and tablets that get connected to the internet should be strengthened. Students should receive free internet access during the pandemic process. Teachers' transition to faster internet infrastructure should be ensured. More frequent feedback should be given to students in online courses. Teachers should be informed about how to make assessments and measurements effectively in online environments. Appropriate portals should be prepared to enhance the effectiveness of online mathematics courses. Parents should be included in the distance education process. Face-to-face training should also be included in the pandemic process. It should not be one-sided merely with distance education.

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