Presentation date: July, 2021 , **Date of acceptance**: Agust, 2021, **Publication date:** September, 2021

05

STUDENTS' OPINIONS REGARDING ON GIVING MATHEMATICS EDUCATION ONLINE, SUGGESTIONS ABOUT IMPROVING THE QUALITY OF EDUCATION, A COVID-19 PANDEMIC STUDY

OPINIONES DE LOS ESTUDIANTES SOBRE LA EDUCACIÓN EN MATEMÁTICAS EN LÍNEA, SUGERENCIAS SOBRE LA MEJORA DE LA CALIDAD DE LA EDUCACIÓN, UN ESTUDIO PANDÉMICO COVID-19

Hediye Sarikaya Yetiş[1]
E-mail: hediye.sarikaya@neu.edu.tr
ORCID: https://orcid.org/0000-0002-6631-6441
Mehmet Salih Yarimsakalli[1]
E-mail: myarimsakalli@gmail.com
ORCID: https://orcid.org/0000-0002-1546-2166
[1] Near East University. Turkey.

Suggested citation (APA, 7th edition)

Yetiş, H. S., & Yarimsakalli, M. S. (2021). Students' opinions regarding on giving mathematics education online, suggestions about improving the quality of education, a Covid-19 pandemic study. ***Revista Conrado, 17(82)***, 43-60.

ABSTRACT

The study aims to determine the students' views on teaching mathematics online and get their suggestions for improvement. The participants were 125 students who study at 25 different departments from different faculties at a private university during the academic year of 2020-2021. The quantitative-qualitative mixed pattern model is utilised in the research. An online form was created in Google Forms and sent to students. In this form, there were some questions regarding their sex, age, departments that they studied in high school, departments they currently enrolled in, and 10 questions related to the research. Participants made many positive and negative opinions about online mathematics education. The answers given by the participants to the questions were examined in separate tables and analysed according to the departments they graduated from high school (numerical and verbal weighted). At the end of the study, researchers made suggestions about to minimize the difficulties experienced during online mathematics education and to increase distance education quality.

Keywords:

Distance Education, Mathematics Education, Student, Use of Technology, Views on Online Education.

RESUMEN

El estudio tiene como objetivo determinar las opiniones de los estudiantes sobre la enseñanza de las matemáticas en línea y obtener sus sugerencias para mejorar. Los participantes fueron 125 estudiantes que cursaron estudios en 25 departamentos diferentes de diferentes facultades de una universidad privada durante el curso académico 2020-2021. En la investigación se utiliza el modelo de patrón mixto cuantitativo-cualitativo. Se creó un formulario en línea en Google Forms y se envió a los estudiantes. En este formulario, hubo algunas preguntas sobre su sexo, edad, departamentos que estudiaron en la escuela secundaria, departamentos en los que se inscribieron actualmente y 10 preguntas relacionadas con la investigación. Los participantes hicieron muchas opiniones positivas y negativas sobre la educación matemática en línea. Las respuestas dadas por los participantes a las preguntas fueron examinadas en tablas separadas y analizadas según los departamentos que egresaron de la escuela secundaria (ponderados numérica y verbalmente). Al final del estudio, los investigadores hicieron sugerencias para minimizar las dificultades experimentadas durante la educación matemática en línea y aumentar la calidad de la educación a distancia.

Palabras clave:

Educación a distancia, educación matemática, estudiante, uso de tecnología, opiniones sobre la educación en línea.

INTRODUCTION

It is seen that 21st-century skills have an important place in terms of technology integration in education. In general, 21st-century skills are grouped under three headings, and each one is divided into branches. These can be listed as:

1. Learning and Innovation: Creativity and innovation, Critical Thinking and Problem Solving, Communication and Collaboration.
2. Information, Media and Technology: Information, Media and Technology Literacy.
3. Life and Career: Flexibility, Adaptation, Enterprise, Social Skills etc.

It is seen that each category mentioned has great importance in terms of education and teaching. This study is generally related to the information, media and technology literacy facet of the second category. It is inevitable for individuals living in the 21 st-century to be media, internet and computer literate when thought that information is formed, primarily through the internet and media (Candarli & Yuksel, 2012). Technology usage is one of the factors that created 21st-century skills. The rapid use of technology and technology adaptation made it compulsory to use it in education and teaching. Mainly due to the Covid-19 pandemic occurring nowadays, individuals perform almost all functions through technology. Phone, tablet, desktop computer and laptop are among the most used technological tools. It is seen that students prefer phones, tablets and laptops while participating in online educations due to their health concerns. Students who have difficulties in using technology experience difficulties in their education; hence, students must possess 21st-century skills (Chiu, 2021).

The emergence of Covid-19 in the world appeared with the report of pneumonia with an unknown cause to the World Health Organization (WHO) China Country Office on 31 December 2019 in Wuhan, China. The WHO has started to work by forming expert teams to analyse the data, make recommendations, and act in coordination with its stakeholders. “International Health Emergency” declaration announced on 30 January 2020. On 11 February 2020, the WHO declared the epidemic as Covid-19. As a result of this situation, chaos has started to occur, especially in the health and education system. This period which declared as “pandemic”, caused a break to face-to-face education among all the primary, middle, high schools and universities located in Turkey and the Turkish Republic of Northern Cyprus. The distance education system started on 23 March 2020 with the Higher Education Institution’s decision in the meeting held on 18 March 2020.

Education, which is defined as the process of deliberately inducing desired behaviour change through an individual’s experience, is a process affected by the developments of our age (Gürer, et al., 2016). There are some changes in education paradigms due to the developments in information and communication technologies and findings obtained from new research in the 21st-century (Inan, et al., 2017). As a result of these changes, some differences are observed in educational environments, teaching approaches, course materials, learning methods and techniques. In addition to previous education concepts, concepts such as e-learning, web learning, web 2.0 tools, online education, and distance education have started to be used and took their place in the literature (Tamah, et al., 2020). Thus, traditional education methods move towards taking on a different appearance in the information age. Distance education has taken its place in education with the opportunities provided by information and communication technologies to human beings, and also, it has provided the formation of new basic concepts related to education.

Distance Education is conducting educational activities without physical interaction through tools such as television, computer, tablet, and mobile phone (Candarli & Yuksel, 2012). Distance education, in which learning occurs, where all kinds of interaction between learner and teacher are provided, and where learner and teacher come together, differ within the formal education process’s scope. In this case, it can be said that the factors affecting learning also vary. Some of the factors that affect the educational process generally are motivation, sense of community, cognitive load and anxiety levels (Chiu, 2021). According to distance education, developed as an alternative to traditional face-to-face education, is the most significant change brought by information and internet technologies to educational environments.

It is predicted that distance education will become more widespread in the period after the Covid-19 pandemic, and it has been found that this education method generally has the following features and benefits (Jones, 1996; Santana De Oliveira, et al., 2018): (1) Being able to participate in the teaching process at any time and place; (2) the opportunity to access course content or material at any time; (3) that teacher and learner are present in different physical environments; (4) use of educational media or other tools; (5) bidirectional communication between student and teacher; (6) the ability to individualize education as well as delivering it to the masses; (7) providing cheaper training opportunities; (8) offering flexibility and diversity in teaching and learning processes; (9) reduce the inequality of opportunity and possibility and provide the

student with a rich learning opportunity; (10) to be able to benefit from experts in different places.

With the start of online education at universities, students' positive or negative opinions about online courses have emerged. Although distance education provides many benefits in social, economic, individual and education system areas, it also contains some difficulties and limitations (Tamah, et al., 2020). Among the benefits; information can spread rapidly from the source of education to the world, it keeps students' motivation at the highest point since there is no time and space limitation, the evaluation is done more objectively, and it provides a low-cost opportunity because there is a material limitation.

The limitations are that all courses are not suitable for distance education, lack of face-to-face communication in learning environments, that feedback and correction cannot be provided instantly during learning, lesson planning problems of individuals who have not gained the habit of individual study, communication problems in crowded student groups, and the economic dimension of infrastructure work required for distance education (Tamah, et al., 2020; Chen, et al., 2020).

It is seen that mostly the provision of numerical courses on the distance education platform leads students to an immense emptiness. It is seen that students have positive opinions about online mathematics education. Some of the positive thoughts are (1) that students can access the lessons whenever they want, and (2) that since the courses are recorded on the distance education platform, they have the chance to look at the subjects again while studying (Sarıkaya & Yarımsakallı, 2020). They indicated the system's benefits that students gained the learning environment they could not usually have at their university, and also, they benefited from different experts' experiences in their fields with the activities carried out via video conferencing.

Due to today's adverse health conditions, the urgent transition to distance education has negatively affected the students. It is clear that the adaptation of students to online courses takes time. Especially in online mathematics education, there are some significant consequences for students, such as having difficulty understanding the subjects and not adapting to the process. This study aimed to reveal students' opinions about online mathematics education during the pandemic period and to receive suggestions for its development. During the study, students will be divided into groups according to the departments they graduated from high school, and their opinions will be examined separately for each question in the interview form. The purposes of separating and comparing students according to the departments they graduated from high school are as follow;

To determine whether the students who studied in the verbal field and the students who studied in the numerical field have the same views

To see / determine whether vocational high school graduates and regular high school (Mathematics and Science, Turkish and Mathematics, Social) graduates have similar opinions about online mathematics education

By taking into account the students' departments graduated from high school, revealing the differences and similarities between face-to-face mathematics education and the distance mathematics education

To determine whether there are common problems faced by students during their online math education according to the departments they graduated from high school

To determine / reveal whether there are common suggestions for the development of online mathematics education among the Vocational High School, Mathematics and Science, Turkish and Mathematics and Social graduates

All determined goals were applied one by one for a total of 10 questions in the online interview form, and the results were compared.

MATERIALS AND METHODS

All primary, secondary and higher education institutions switched to online education with the sudden appearance of the Covid-19 pandemic in our country after the face-to-face start of education in the 2019 - 2020 Spring period. In this study, students' opinions and thoughts on providing mathematics education in distance education were evaluated. In this context, "Opinions of Students the Delivery of Mathematics Education in the Form of Distance Education" has been included, and a qualitative-quantitative mixed pattern research model has been adopted.

The research participants consisted of students from different faculties and departments who take Mathematics courses in a private university during the 2020-2021 Fall semester. Our study group consists of 125 (N = 125) voluntary students studying in 25 different departments in different faculties. Distribution by demographic information is summarized in Table 1. Some abbreviations were used in the study, and they are summarized as follows to understand the study better:

MS: Mathematics and Science

TM: Turkish and Mathematics

SOC: Social

VHC: Vocational High School

Table 1. Students' Demographic Information.

		N	%	Branch/Department
Sex	Male	MS = 47 TM = 3 SOC=4 VHC= 32	68.8	Mathematics Education (9), Electrical and Electronics Engineering (19), Civil Engineering (13), Mechanical Engineering (13), Primary Mathematics Education (10), Natural Gas and Petroleum Engineering (1), Automotive Engineering (4), Banking and Finance (5), International Business (1), Computer Engineering (7), Audiometry (1), Medical Imaging Techniques (6), Business Administration (5), Classroom Teaching (9), Psychology (6), Accounting and Tax Applications (3), Gastronomy (3), Food Engineering (2), Foreign Trade (1), Tourism and Hotel Management (4), Biomedical Device Technology (1), Nutrition and Dietetics (2)
	Female	MS = 15 TM = 14 SOC=3 VHC = 7	31.2	
Age	Age of 19-23	MS = 40 TM = 13 SOC=7 VHC = 28	70.4	
	Age of 24-28	MS =12 TM = 3 SOC= 0 VHC = 9	19.2	
	Age of 29-32	MS = 6 TM = 1 SOC= 0 VHC = 2	7.2	
	Age of 33-37	MS = 4 TM = 0 SOC= 0 VHC = 0	3.2	

62 students from MS, 39 VHC, 17 TM and 7 SOC graduates voluntarily participated in the study. 68.8% of the participants are men, and 31.2% are women. The youngest participant is 20 years old, and the oldest is 37 years old.

Interview technique was used to reveal student views about providing mathematics education as distance education. The data of the research were obtained through a semi-structured interview form. Four field experts were consulted for that matter and got approved to determine the validity and reliability of the questions in the semi-structured interview form. While preparing the interview form, care was taken to ensure that the questions could reveal the status of Mathematics education and the students' problems during the distance education process. Due to the Covid-19 pandemic process, face-to-face meetings could not be held with the participants. Interview form questions were prepared in the "Google Forms" program and sent to the students in a form format. In the interview form prepared for students on Google Forms, the students were asked about gender, age, the department they graduated from high school and the department they are currently studying at the university. In order for students not to have difficulty understanding the meanings of some words in the questions prepared on Google Forms, an information box was opened, and definitions were included in the form. The responses of the participants were also received via Google Forms. The data were collected during January and February 2021.

Table 2. Interview Form Questions Created for Students.

Is mathematics lesson suitable for distance education? Why is that? Explain.
Does online math education have the same features as face-to-face math education? Why is that? Explain.
What are the advantages of online math education? Why is that? Explain.
What are the difficulties you face during online math education? Why is that? Explain
Are the methods and techniques used by lecturers suitable for online mathematics education? Why is that? Explain.
Are the teaching materials used by the lecturers sufficient? Why is that? Explain.
What kinds of teaching tools (graphic tablet, tablet, external software etc.) do lecturers use during online math education? What are the advantages / disadvantages of the teaching tools used? Explain.

Should students be educated about the platforms where education is given before starting to provide mathematics education in the form of distance education? Why?
What should be done to increase the quality of online mathematics education? Why is that? Explain.
Do you think that teachers should improve in technological formation as well as in professional formation (pedagogy)? Why is that?

In Table 2, the interview form questions directed to the students are shown and the answers given to these questions were examined in detail in the study.

Among the qualitative data analysis types, the most commonly used method is content analysis. This method is generally used in analysing written and visual data (Silverman & Data, 2001). The primary purpose of content analysis is to reach the concepts and relationships that explain the collected data. For this purpose, the data collected must first be conceptualised, then organised logically according to the emerging concepts, and the themes presenting the data must be determined accordingly. The content analysis process is to gather similar data within the framework of specific concepts and themes and interpret them in a way that the reader can understand (Santana de Oliveira, et al., 2018).

After this analysis method, a framework was created according to the themes, the data were processed, and the findings were defined and interpreted. Thus, descriptive analysis has been created. The data obtained in the descriptive analysis are transferred in the form of quotations as they are unchanged. The aim is to present the results we have conveyed to the reader in an edited and interpreted form. Briefly, descriptive analysis can be defined as summarising and analysing data obtained under previously determining titles. The descriptive analysis consists of four stages. These are: (1) Creating a framework for descriptive analysis, (2) Processing the data according to the thematic framework, (3) Identifying the findings, (4) Interpreting the results (Sarıkaya & Yarımsakallı, 2020; Chiu, 2021). Different operations are performed at each stage of descriptive analysis (Chen, et al., 2020). These are: (1) At the stage of creating a framework for descriptive analysis, a framework for data analysis is developed, starting from the research questions, the research's conceptual framework, or the dimensions included in the interview and/or observation. (2) In the process of data processing according to the thematic framework, the data obtained are read and organised according to the frame created previously. (3) When defining the findings, the data edited at the last stage are defined and supported with direct quotations where necessary. (4) During the interpretation of the findings, the explanation, association and interpretation of the identified findings are made. Explaining the cause-and-effect relationships between the results and making comparisons between different cases, if necessary, help the researcher's interpretation be more qualified.

RESULTS AND DISCUSSION

In this section, findings regarding the students' views on the delivery of Mathematics education in online education, the results of which were obtained from the interview form, are presented. Tables were created by the researchers at the end of the coding and tabulation process of the content analysis performed on the data obtained as a result of the interview form sent to the students. Tables were made with the data obtained from the interview forms, and all of them are discussed in detail below.

Table 3. Positive views of the students regarding the question "Is mathematics lesson suitable for distance education?"

	Number of Students by Departments (Frequencies) (f)				
Positive Views	MS	TM	VHC	SOC	Total
It is a suitable course. It depends on the learning level and the lecturers' style of expression.	6	3	4	-	13
SuiTable	8	2	6	-	16
Due to the pandemic period we are in, I think that online mathematics lessons are efficient.	3	-	2	-	5
It is a suitable course as long as the necessary materials are provided.	1	-	-	1	2
Recording lectures and listening to lectures over again results in better learning.	-	-	2	-	2
Students try harder, which results in better learning.	1	-	-	-	1

It is absolutely suitable. Theoretical knowledge and the applications carried out in the light of this information are only possible by following the teacher, and there is no physical obligation to teach. The student can also learn this information through distance education.	1	-	-	-	1
Using appropriate technological tools (tablet, computer, etc.) causes the lesson to be efficient.	2	1	-	-	3
Explaining the topics on the slides causes faster processing and more time is left to solve questions.	2	1	2	-	5
Lessons in the classroom can also be done on the distance education platform.	1	-	3	-	4
Since we are in dialogue, we are not far from the classroom environment.	2	-	-	-	2
Online mathematics lessons on the computer have the same feature as face-to-face education.	2	1	1	-	4
Total	29	8	20	1	58

When Table 3, is examined, 58 students participating in the survey, that is, 45.6% of the participants, argued that it is appropriate to conduct mathematics lessons in the form of distance education. When examined in more detail, 46.77% of the MS group, 47.06% of the TM group, 14.29% of the SOC group and 51.28% of the VHC group found it appropriate to teach mathematics as distance education.

Table 4. Negative opinions of the students regarding the question 'Is mathematics lesson suitable to be given in the form of distance education?'

	Number of Students by Departments (Frequencies) (f)				
Negative Opinions	MS	TM	VHC	SOC	Total
No. Explaining the numerical lectures on slides causes the subject not to be understood.	2	1	2	-	5
It is more appropriate to demonstrate mathematical operations on a whiteboard in face-to-face education.	2	-	2	-	4
Since the mathematics lesson is a difficult lesson, students are more afraid and distant from the lesson during the distance education process.	1	-	-	-	1
The student should listen to the teacher one to one. Without the order in the classroom, the student cannot concentrate, and the incomprehensible places are passed without being asked.	3	-	1	3	7
None of the courses are suitable to be taught on a distance education platform.	4	-	-	-	4
No. Because numerical lessons are lessons in which communication should be strong.	5	-	2	2	9
Mathematics is learned better in a practical way in face-to-face education.	3	3	4	-	10
It is very difficult for lecturers to convey the subjects to the students.	2	-	-	-	2
Not suitable.	8	5	6	1	20
Students cannot express themselves; they cannot practice as they are face to face; therefore, online lessons are more difficult to understand.	2	-	2	-	4
It is not suitable for taking exams.	1	-	-	-	1
Total	33	9	19	6	67

When Table 4 is examined, 67 or 53.6% of the students participating in the survey stated that mathematics lessons could not be given online. Percentage of students with negative opinions; MS group constitutes 53.23%, TM group 52.94%, SOC group 85.71% and VHC group 48.72%.

Table 5. Positive opinions of the students regarding the question "Does online mathematics education have the same features as face-to-face mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Positive Opinions	MS	TM	VHC	SOC	Total
Mathematics lessons can be taught in the same way in any environment.	6	-	6	-	12
Questions can be asked at any time during online education.	2	1	-	-	3
Topics become more understandable by listening to videos again.	2	-	3	-	5
Yes, it does.	7	3	4	1	15
Online math lessons help you save time on topic processing.	1	-	-	-	1
Online education is better than face-to-face education.	1	-	-	-	1
If the lecturers explain the subject well, solve plenty of examples and share additional resources, there will be no problems.	3	-	5	-	8
Since mathematics is a difficult lesson, lessons progress more efficiently due to the silence during online education.	1	-	-	-	1
If appropriate technological infrastructure is provided, it will not be different from face-to-face education.	-	1	-	-	1
Online training is better since if no formula is understood while lecturing, it can be searched on the internet and learned immediately.	-	-	1	-	1
Total	23	5	19	1	48

When Table 5 is examined, 48 of the students, i.e. 38.4%, argued that there was no difference between online math education and face-to-face math education, and even online math lessons were more efficient. According to the departments they graduated from, percentages of the participants are 37.10% of the students who graduated from the MS department, 29.41% from the TM department, 14.29% from the SOC department, and 48.72% from the VHC.

Table 6. Negative opinions of the students regarding the question "Does online mathematics education have the same characteristics as face-to-face mathematics education?".

	Number of Students by Departments (Frequencies) (f)				
Negative Opinions	MS	TM	VHC	SOC	Total
Students may find it difficult to ask questions or speak up during online training, but it is easy to have them in face-to-face education.	5	4	6	2	17
No, it does not.	11	1	4	4	20
Face-to-face trainings are more beneficial and more important to the student.	9	3	5	-	17
Both situations have advantages and disadvantages.	2	-	-		2
Students who cannot listen to the mathematics lesson well due to the problems on the internet cannot obtain efficient information.	2	-	3	-	5
The teacher's sense of lecturing, comprehending the lesson and conveying it to the student is definitely better in face-to-face training.	1	2	-	-	3
Lecturing differs in online and face-to-face training.	2	-	-	-	2
It is very difficult to give and understand digital courses online in general.	3	2	-	-	5
Motivation and lack of focus occurs in online math education.	2	-	1	-	3
Insufficient time in online math exams turns all positive aspects into negative.	1	-	-	-	1
Face-to-face and online mathematics trainings are suitable for lectures but differ for the application parts.	1	-	-	-	1
It is used extremely inefficiently in situations where the use of technology by educators is not good.	-	-	1	-	1
Total	39	12	20	6	77

When Table 6 is examined, 77 students participating in the questionnaire (61.6%) argued that online mathematics education did not have the same features as face-to-face mathematics education and that face-to-face lessons were more efficient. Considering the departments, they graduated from, 62.90% is MS, 70.59% is TM, 85.71% is SOC, and 51.28% is VHC students.

Table 7. Positive opinions of the students regarding the question "What are the advantages of online mathematics education to you?".

	Number of Students by Departments (Frequencies) (f)				
Advantages	MS	TM	VHC	SOC	Total
To be able to listen to the records taken in online math lessons	10	6	11	5	32
While the figures or graphics drawn on the board during face-to-face education cause a waste of time, in online education, time loss is minimized as the trainer reflects the shape or graphic directly on the screen.	4	-	-	-	4
During online education, we can be wherever we want and feel more comfortable.	12	4	2	1	19
It helps to save time	6	1	5	-	12
Working environment is more suitable	2	1	1	-	4
Graduating from a math class without learning anything	1	-	-	-	1
Ability to search on the internet related to the subject during the education	1	-	-	-	1
Continuous start of the lessons on time, continuous academic information is transferred without any details that will disrupt the course flow, and this has a great effect on individual development.	1	-	2	-	3
I improved myself in computer use.	3	-	1	-	4
It is easier to follow the topics.	2	-	1	-	3
Having more resources in the lessons and more question solutions increased the efficiency.	2	4	2	-	8
We are psychologically prepared for mathematics lessons more than formal education.	2	-	-	-	2
We can cheat more comfortably in exams.	1	-	-	-	1
Total	47	16	25	6	94

According to 94 of the students, that is, 75.2%, the advantages of online mathematics education are as indicated in Table 7. When the departments from which the participants graduated are examined, it is seen that 75.81% of MS group students have mathematics lessons on online education advantageous, similarly 94.12% of TM group students, 85.71% of SOC group students and 64.10% of VHC students.

Table 8. Negative opinions of the students regarding the question "What are the advantages of online mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Disadvantages	MS	TM	VHC	SOC	Total
It has no advantage.	14	1	14	1	30
Interrupting the lesson due to a problem with the internet connection.	1	-	-	-	1
Total	15	1	14	1	31

When Table 8 is examined, 31 students, that is 24.8%, have listed the disadvantages of online mathematics education as seen above. 24.19% of the opinions in the table are MS group, 5.88% TM group, 14.29% SOC group and 35.90% VHC.

Table 9. Students' views on the question "What are the difficulties you encounter during online mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Difficulties	MS	TM	VHC	SOC	Total
The difficulties experienced in the technological equipment used (Tablet, phone, etc.) and the insufficiency of materials	3	1	3	-	7
I am having trouble understanding and applying the subjects.	8	3	8	1	20
Power outages	1	-	2	2	5
Internet connection problems and interruptions	15	5	8	-	28
Since math is a difficult lesson in general, I have trouble when we miss the lesson or as a result of distraction.	4	-	-	-	4
Insufficient time in evaluations and inability to write formulas comfortably in classical questions	5	1	-	1	7
Not being able to ask questions that we do not understand after the lesson to the educator	1	-	-	-	1
During the lesson, it is difficult for the educators to use concrete examples.	2	-	-	-	2
Too much homework	1	-	-	-	1
Limited information exchange between educator and student	10	2	3	-	15
I did not have any difficulties.	12	5	15	3	35
Total	62	17	39	7	125

When Table 9, which includes the answers of the students in response to the question of the difficulties they faced in the online mathematics lesson directed to the students, is examined, 35 (28%) students who stated that they did not experience any difficulties, 28 (22.4%) students who indicated their connection problems due to the internet, and 20 (16%) students who expressed their difficulty in understanding the online mathematics lessons and their challenges in applying in the questions are included in the Table 9.

Table 10. Students' positive opinions regarding the question "Are the methods and techniques used by lecturers suitable for online mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Positive Opinions	MS	TM	VHC	SOC	Total
They are.	34	7	16	2	59
It is convenient as the lessons are conducted by demonstrating step-by-step procedures.	2	-	1	-	3
The methods and techniques used are used in the best possible way for online mathematics education.	4	-	3	-	7
Since mathematics is a lesson based on sample solving, it varies according to the educator.	1	-	1	-	2
I find it more effective as we can watch the lesson again and as extra materials are used.	5	2	3	-	10
It is possible to improve the techniques by asking more questions in homework and exams.	1	-	-	-	1
Educators properly convey the subjects to the students using appropriate methods and techniques.	1	2	3	-	6
The methods used by using a graphic tablet are more convenient as it does not bore the student in terms of time.	1	-	1	-	2
Educators also have nothing to do on these issues.	2	1	-	3	6
With online education, education can be provided with more convenient and easy applications.	-	1	2	1	4
Total	51	13	30	6	100

When Table 10 is examined, 100 students (80%) stated that they found it suitable in the face of the question, "Are the methods and techniques used by lecturers suitable for online mathematics education?". 82.26% of the MS group, 76.47% of the TM group, 85.71% of the SOC group and 76.92% of VHC students found it appropriate.

Table 11. Negative opinions of the students regarding the question "Are the methods and techniques used by lecturers suitable for online mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Negative Opinions	MS	TM	VHC	SOC	Total
The materials used are useful for students.	4	-	1	-	5
Better methods can be used.	1	-	3	-	4
It needs to be developed more.	4	1	1	-	6
No, they are not.	2	1	3	1	7
The techniques that can be used in online education may be limited in terms of lecture, demonstration, presentation or video. It would not be suitable for this.	-	2	-	-	2
Education mostly take the form of lectures and this makes the students passive after a certain period of time. There is difficulty in listening or focusing on the lesson.	-	-	1	-	1
Total	11	4	9	1	25

When Table 11 is examined, 25 students, in other words, 20% of the participants, did not find suitable for the question "Are the methods and techniques used by lecturers suitable for online mathematics education?" According to the departments they graduated from, the distribution of these students is 17.74% MS, 23.53% TM, 14.29% SOC and 23.08% VHC.

Table 12. Positive views of the students regarding the question of "Are the teaching materials used by lecturers sufficient?"

	Number of Students by Departments (Frequencies) (f)				
Positive Opinions	MS	TM	VHC	SOC	Total
The materials used are for the benefit of the students.	2	-	2	-	4
Yes, they are.	40	8	24	2	74
During the pandemic period, the teaching staff used all their means.	1	1	1	-	3
As long as they go by typing and solving questions from the tablet or phone, it is enough, there is no need for more.	1	-		-	1
Many videos and resources are uploaded, and we can easily benefit from them whenever we want.	3	2	3	-	8
There are limited topics that can be done in online math classes, and despite these limitations, it is well managed.	-	1	-	-	1
Total	47	12	31	2	91

When Table 12 is examined, 91 of the students, that is 72.8%, found the teaching materials used by the lecturers sufficient. Considering the departments the students graduated from, it is seen that 75.81% of MS graduate students, 70.59% of TM graduates, 28.57% of SOC students and 79.49% of VHC students defend this opinion.

Table 13. Negative opinions of the students regarding the question of "Are the teaching materials used by the lecturers sufficient?"

	Number of Students by Departments (Frequencies) (f)				
Negative Opinions	MS	TM	VHC	SOC	Total
No, they are not.	2	2	4	4	12
The lessons should be taught by drawing and writing on a tablet, not reading on PDF.	2	-	-	-	2
Materials should be increased.	4	2	1	-	7
I think it is not teaching that the teachers give the student 45 slide presentations about the lesson, additional video and site suggestions, and then they do a lesson in 5 minutes and leave. This is stressing the student. The lesson should be listened to in the lesson, then repeated and developed with additional resources. Nothing happens if the teachers do not teach the lesson and just give resources.	2	2	-	1	5
I am not sure.	5	-		-	5
No matter how good the materials are, nothing beats face-to-face education.	-	-	2	-	2
It varies from educator to educator.	-	-	1	-	1
Total	15	6	8	5	34

When Table 13 is examined, 34 students think that the lecturers' materials are insufficient, and these students constitute 27.2% of the research group. The percentages of the students who defend this view are as follows; 24.19% of MS graduates, 35.29% of TM graduates, 71.43% of SOC graduates and 20.51% of VHC students stated negative opinions.

Table 14. Students' opinions on the question "What kinds of teaching tools (graphic tablet, external software, etc.) do lecturers use during online mathematics education? What are the advantages / disadvantages of the teaching tools used?"

	Number of Students by Departments (Frequencies) (f)				
Teaching Tools and Advantages	MS	TM	VHC	SOC	Total
Using the tablet, we solve live questions in the lesson and thus we can understand the lesson more easily.	7	-	2	-	9
Screen sharing is used with a computer.	12	2	9	-	23
They use all kinds of teaching tools required for students.	2	2	3	-	7
Instructor is projecting whiteboard from computer.	4	1	2	-	7
Distraction can be prevented with the teaching tools used.	1	-	-	-	1
With the teaching tools used, better learning occurs, and the lessons are more efficient.	7	1	6	-	14
It provides ease of learning and brings it closer to face-to-face education.	2	1	-	-	3
A graphic tablet is used. The advantage is difficulty disappears while writing on the screen and time is sufficient.	9	3	7	1	20
Thanks to the videos, the topics are supported and strengthened.	6	2	-	1	9
They prepared and shared slide works, lectured on the board and watched us from the camera, reflected their screens with the software they used, and drew curves from the tablet, and taught us how to use this software.	1	-	-	-	1
Total	51	12	29	2	94

When Table 14 is examined, 75.2% of the students think that lecturers' teaching tools during their online mathematics education have advantages, and it is seen that these advantages are as in the table above. The 18.4% (23 people) group argues that the best advantage of online mathematics education is screen projection on the computer. The group of 16% (20 people) say that graphic tablets used during online mathematics education are among the best advantages. Fourteen people (11.2%) argue that lecturers' teaching tools in the online mathematics education process enable more efficient learning.

Table 15. Negative opinions of the students regarding the question "What kinds of teaching tools (graphic tablet, tablet, external software, etc.) do lecturers use during their online mathematics education? What are the advantages / disadvantages of the teaching tools?"

	Number of Students by Departments (Frequencies) (f)				
Instructional Tools and Disadvantages	MS	TM	VHC	SOC	Total
I have no opinion on this matter	7	-	4	3	14
It does not have any advantage.	4	3	3	1	11
It can be more effective if more extensive applications are used.	-	1	1	1	3
This topic is not the same for all educators. Because not every educator takes the necessary care.	-	1	-	-	1
It has no advantage. Because, using these tools, the lessons are not efficient because the lessons are taught serially.	-	-	2	-	2
Total	11	5	10	5	31

When Table 15 is examined, 24.8% of the student group argues that the teaching tools used by lecturers during their mathematics education do not provide any advantage in the learning process.

Table 16. Students' positive opinions regarding the question "Whether students should be educated about the education platforms before the mathematics education started to be given in the form of distance education?"

	Number of Students by Departments (Frequencies) (f)				
Opinions	MS	TM	VHC	SOC	Total
It may be helpful to learn in advance what we will encounter during the lessons.	8	4	4	-	16
Preparing training videos will be fruitful for us.	1	2	4	-	7
It should definitely be given. Because there may be problems in understanding the system and therefore the lessons may be delayed.	4	2	1	1	8
It should be given.	15	2	14	1	32
There are many students who do not know how to use computers. Because they don't have computers. The state must provide these students with the necessary materials and provide the necessary training.	3	-	-	2	5
This type of training should be provided so that students should be able to take part as active individuals in the distance education platform.	3	-	3	-	6
As a society, we are not aware of online training, so it must be given.	2	-	3	1	6
Yes. Because there is a serious difference between students who do not have technical knowledge and who do not. People who do not know that they can solve technical difficulties on their own cannot benefit from education well enough. Eliminating the uncertainties and lack of information will increase both the interest and performance of the students, and thus their anxiety and prejudices will be reduced.	-	2	-	1	3
Whether or not training is provided, the old education system should be reverted to because nothing can replace face-to-face training.	1	-	-	-	1
I have no opinion on this matter	4	-	3	-	7
Because of the technology generation we are in, students have a good command of technology. So, there is no need for training.	5	-	3	-	8
It should not be given.	16	4	4	1	25
It does not need to be given before because it can be learned during the process.	-	1	-	-	1
Total	62	17	39	7	125

When Table 16 is examined, while 25.6% (32 people) defends the opinion that education should definitely be given, 20% (25 people) defends the opinion that there is no need for such training when asked: "Whether students should be educated about the education platforms before the mathematics education started to be given in the form of distance education?".

Table 17. Students' views on the question "What should be done to increase the quality of online mathematics education?"

	Number of Students by Departments (Frequencies) (f)				
Opinions	MS	TM	VHC	SOC	Total
I have no opinion.	4	1	3	2	10
The lessons made are of sufficient quality.	20	1	15	-	36
It would be better for the instructor to give the lesson in handwriting and attend the lesson like that.	2	-	-	-	2
A better-quality education can be provided by increasing the technology knowledge of lecturers.	2	-	-	-	2
Platforms can be created that contain all topics related to mathematics lessons.	2	1	1	-	4
The training tools used can be more efficient.	6	-	-	-	6
Discussion environments should be created.	3	-	-	-	3
The lesson should be taught as if it is done more face-to-face. That way, most of us listen straight, just like listening to a tape. There may be problems such as focusing and comprehending.	1	1	-	-	2
The programs used for solving questions are required for displaying extra questions by writing.	10	1	6	1	18
Teacher-student relationship should be developed.	2	-	-	-	2
Better quality cameras should be used.	4	-	1	-	5
Students should be strictly prohibited from opening microphones or speaking during the exam. In addition, the Safe Exam Browser (SEB) application is very distracting.	4	3	1	-	8
Graphic tablet etc. products must be provided to both instructors and students.	2	-	2	-	4
The feeling of the classroom environment can make both students and lecturers feel better. For this, the infrastructure of the classrooms can be improved, and the lecturer can continue to lecture in the classrooms as if the students are there, thus this may increase motivation.	-	1	2	-	3
In order to increase the quality of online mathematics education, platforms should be developed where the student can also solve the questions with the teacher.	1	2	2	-	5
It should be explained with more comprehensive, more concrete material, with examples. Students should not be guided to memorization and logic should be taught.	-	6	1	-	7
Lessons should not be held online, or a better internet infrastructure should be established.	-	-	4	-	4
The duration of online math lessons should be increased. In this way, both the quality will increase, and the retention of the subjects will increase.	-	-	1	1	2
It may be better if the curriculum is adapted for online education, the situation of the students and the requirements of the subjects.	-	-	-	1	1
Explanation of the subjects beforehand will help students to attend the lesson prepared.	-	-	-	1	1
Total	62	17	39	7	125

When Table 17 is examined, 28.8% of the students, that is, 36 students, argued that it is more beneficial for the educators to explain the subjects by writing (in short, traditional methods). Considering the frequencies, the group of 18 people, i.e., 14.4%, argued that the solution to the questions should be explained by writing. Ten of the students, who make up 8%, did not give any opinion on this issue.

Table 18. Students' views on the question "Do you think that lecturers need to develop in technological formation as well as professional formation (pedagogy)?"

	Number of Students by Departments (Frequencies) (f)				
Opinions	MS	TM	VHC	SOC	Total
Yes.	26	10	17	3	56
Not necessary. Because right now is enough.	14	1	10	3	28
I have no opinion on this matter	4	1	5	-	10
They can receive in-service training.	2	-	-	1	3
I think partly.	4	-	1	-	5
Yes, it is required. Because even the professors who have spent their years in education now have problems with the use of technology.	1	-	-	-	1
Today's conditions require every teacher to be perfect in this regard. Certainly, every teacher candidate should receive such training during their university education.	1	1	-	-	2
I think, definitely. Apart from training, a teacher should be able to use technological tools in accordance with education and always update himself/herself.	4	2	-	-	6
Educators who have little use of technology during their undergraduate period should receive this type of training especially since they are lagging.	5	-	4	-	9
The pandemic has started a new era all over the world and most systems are happening online via computers. Instructors also need to be well equipped with technology.	1	2	2	-	5
Total	62	17	39	7	125

When Table 18 is examined, 44.8% of the students defended the view that lecturers should improve themselves in technological formation as well as professional formation, and 22.4% of students defended the view that lecturers are sufficient in technological formations.

As in the whole world, the Covid-19 pandemic has negatively affected all sectors and social areas in the TRNC and the education field. Distance education has emerged as an inevitable phenomenon to minimize the adverse effects on education. It took some time for students and lecturers to adapt to the distance education platform. Especially students who are not good at using technology have difficulty in keeping up with this process. It is observed that obstacles experienced during education (connection problem, power outages, etc.) negatively affect students' motivation. Problems arising from the inability to access or use the system can cause students to dishearten and quit online education (Lee & Choi, 2011). Insufficient teaching methods, teaching tools and materials used in the lessons also affect students' learning negatively.

Giving digital courses on a distance education platform can cause fear and anxiety in students. The lecturers' methods and techniques during their online mathematics education are of great importance for their students. The studies carried out demonstrated several advantages provided by online education to students. Some of them are that the materials are always on the distance education platform and that with the recordings of the online lessons, there is an opportunity to repeat the subject by opening these lessons and listening again.

As stated in the introduction, after comparing the opinions of the students according to the departments they graduated from high school, many positive or negative views about online mathematics education have emerged and the results obtained from the 10 questions in the interview form are as follows;

The results obtained regarding whether it is appropriate to give mathematics lessons in the form of distance education are as follows; There are many positive and negative opinions of the students regarding the teaching of mathematics lessons as distance education. When Table 3 and Table 4 are examined, it is seen that the number of students who expressed positive opinions (f = 58) is less than the number of students who expressed negative views (f = 67). When Table 3 is examined, among the common opinions of students from MS, TM and VHC; It depends on the learning level of the students and the teaching style of the lecturers, the subjects process faster thanks to the materials used in the lessons and the more time left in the solution of the examples. These findings are in line with the results obtained in the study of Caldwell (2006).

These studies examined the differences in academic performance, motivation, satisfaction and students' different lesson completion rates between face-to-face education, web-supported education and web-based education. They found that web-based education is as effective and successful as face-to-face education in terms of academic performance. When Table 4 is examined, it is seen there is not much difference between the percentages of students with negative opinions when looking at their high school graduate departments which are TM, MS and VHC.

Low information exchange between the teacher and the student, better understanding of the mathematics lesson in the classroom, and the inefficiency of the mathematics lessons taught on the slides are among the common negative opinions. The majority of SOC graduate students, 85.71%, stated that it is not appropriate. This result reveals that students who received minimal mathematics education in high school had severe difficulties in the online education process. It also shows that individuals who learned mathematics well in high school can adapt better to the online education process. When Table 4 is examined, and the results obtained are considered, the study of Lee & Choi (2011), supports the results obtained.

The findings on whether online mathematics education has the same features as face-to-face mathematics education are as follows; The number of students who argue that both have the same characteristics (f = 48) is less than the number of students who say that they have different characteristics (f = 77). When Table 5 is examined, VHC students, compared to the students who graduated from MS, TM and SOC, argued that mathematics education has the same characteristics when it is done in both ways. Their opinions are detailed in the Table Students who graduated from MS, TM and VHC advocated that both education models have the same characteristics, and that online mathematics education is more beneficial than face-to-face instruction. Some of these views are that silence during the education helps the lesson be more efficient, watching the videos repeatedly results in a better understanding of the classes and helps to gain time in terms of processing the subject.

These results are similar to the studies of Chen, et al. (2020), in which they examined the views of 524 Faculty of Education students towards distance education and found that there was no difference in the attitudes of the students according to the type of high school they graduated. Considering the departments where the students graduated from high school, which argues that face-to-face mathematics education is more efficient and does not have the same features as online education, SOC graduates are in the first, second MS, third TM, and fourth VHC graduates. When Table 6 is examined, among the views that students in all departments have gathered on a common denominator; It is shown that students do not generally have and that they are not comfortable asking questions and speaking during online education in face-to-face education.

The results obtained in line with the opinions of the students regarding the question "What are the advantages of online mathematics education to you?" are as follows; When Table 7 is analyzed, most of the students (75.2%) stated that online mathematics education is advantageous. That live lectures are recording, so that students can watch the lessons again and that they do not have to be a specific place during online education are among the common views of MS, TM, VHC and SOC graduates. In the light of the findings obtained, almost all of the TM graduate students argue that online education provides them with an advantage, and these views are seen in detail in Table 7. The opinions given in Table 7 shows that findings of the study of Almanthari, et al. (2020), by investigating the perceptions of university students towards distance education that online learning is essential and that permanence in learning provided without space and time limitation due to the recording of the courses.

The findings obtained regarding students' difficulties during their online mathematics education are as follows; When Table 9 is examined, it is seen that 28% of the students do not experience problems and 72% of them stated that they have issues. When the students are examined according to the departments they graduated from high school, it is seen that they have common difficulties such as understanding and applying the subjects and power outages. It is seen that the participants in the study conducted by Almanthari, et al. (2020), experienced difficulties similar to the views of the students given in Table 9. When Table 9 was examined, it was seen that the students expressed their opinion that they did not experience difficulties, but they did not provide any reason.

The findings obtained regarding the question "Are the methods and techniques used by instructors suitable for online mathematics education?" are as follows; While 100 students (80%) found it suitable, 25 students (20%) did not. When Table 10 is examined, it is stated that the methods and techniques used by lecturers for mathematics education are appropriate. According to the departments they graduated from high school, the distribution of the students is close to each other. 82.36% of MS graduates, 76.47% of TM graduates, 76.92% of VHC graduates and 85.71% of SOC graduates found the methods and techniques used by lecturers during their mathematics education appropriate. Mostly when Table 10 and the

percentage distribution is examined, it is seen that TM graduates and VHC graduates are close to each other and almost the same. Using extra materials and using appropriate methods to convey the subjects correctly to the students are Among the common opinions they gave are. Likewise, it is noteworthy that the percentages of students with MS and SOC graduates are close. A small part of the students participating in the study did not find the lecturers' methods and techniques appropriate. When the students were examined according to the departments they graduated from, it was seen that different students from each department put forward different opinions. When Table 11 is reviewed, some thoughts are using or developing better methods, arranging the techniques used during online mathematics education not to cause any time problems.

The findings obtained on whether the teaching materials used by the instructors are sufficient or not are as follows; While 91 students (72.8%) who participated in the study found it adequate, 34 students (27.2%) did not find it sufficient. When Table 12 is examined, it is seen that the distribution of MS, TM and VHC graduates are close to each other, and they argue that the teaching materials are sufficient. that during the Covid-19 pandemic period, educators use all the means available to them, and that since many resources are uploaded to the system where the courses are held, students can easily access these resources whenever they want are among the common views they defended.

Looking at these results, it observed that we had obtained the same findings with the results of study of Tonbuloğlu & Gürol (2016), which showed that distance education offers many advantages such as less time, low cost, service to students of all age groups, equal opportunity, production and dissemination of information, easy and fast access. When Table 13 is examined, it is seen that the students express the opinion that the teaching materials are not sufficient. Considering the departments where the students graduated from high school, SOC graduates come first, and TM graduates come second. In general, the opinions they defend on this issue are that the materials should be increased and that no efficiency can be gained by sharing too much material unless the lessons are taught efficiently.

The findings obtained result from the students' opinions on the question "What kinds of teaching tools (graphic tablet, tablet, external software, etc.) do lecturers use during their online mathematics education? What are the advantages/disadvantages of the teaching tools to you?" as follows; 75.2% of the students argued that the teaching tools they used during their online mathematics education were advantageous.

It is seen that students who graduated from MS, TM and VHC express more common views and some of these opinions are screen mirroring with computers, teachers using all kinds of teaching tools that students need, projecting a whiteboard using computers, and gaining time by using a graphic tablet. When the literature is examined, it is seen that drawing figures in different colours or emphasizing texts is positive for a numerical lesson and provides student motivation (Galligan, et al., 2010).

Hence, this has revealed the importance of using a graphic tablet. The results obtained show similarities with the findings of the studies by Papadopoulos, et al. (2011); and Tonbuloğlu & Gürol (2016), in terms of the lecturers' tools and the advantages they provide. A small portion of the participants, namely 24.8%, argued that teaching tools have disadvantages but did not give much opinion on this.

The findings obtained on whether students should be educated about the education platforms before the mathematics education started to be given in distance education are as follows; When Table 16 is examined, many opinions of the participants on this issue are encountered. Considering the departments where the students graduated from high school, 25.6% of them, in other words, 32 people, argued that education should be given. The common opinion of the graduates of MS, TM, SOC and VHC on this subject is that being prepared in advance for the system and knowing how to use the system can prevent the lessons' disruption. The results obtained are in line with the studies of Inan, et al. (2017). 20% of the participants, that is, a total of 25 students from MS, TM, SOC and VHC graduates, argued that there is no need for such training.

The results obtained from the issue of what should be done to increase the quality of online mathematics education are as follows when Table 17 is examined, the opinions of the participants to improve the quality of the education can be seen in detail. When the results obtained are analysed according to the departments they graduated from high school, it is seen that the graduates of MS, TM and VHC have shared common views. That the quality of the online mathematics lessons is good enough, the creation of different sites containing every subject related to mathematics, the use of extra programs for question solutions, the development of platforms where the student is at the centre instead of the platforms where the teacher is at the centre, preventing students from being in the mood for talking and the need of providing students with the information about security websites that will be used in exams beforehand are among these opinions.

The results obtained regarding the question "Do you think that lecturers should improve in technological formation besides vocational training?" can be summarized as follows; When Table 18 is examined, it is seen that they argue that lecturers are sufficiently advanced in technological formation, while the percentage that the lecturers need to improve themselves in technological formation is higher. Some of the views offered regarding the improvement of the lecturers in technological formation are the necessity of every teacher to improve himself/herself on this subject due to today's conditions, the need for lecturers to be able to use technological tools effectively during online education, and the need for teachers to be fully equipped in technology when it is predicted that online education will continue for a long time due to the pandemic process. Learning the perception of the prospective teachers for the ICT terms is important to take protective actions to change the undesirable perceptions of the prospective teachers for the ICT which is widely used in schools in this pandemic process (Akdemir, et al., 2020).

CONCLUSIONS

In general, when the findings obtained from the study evaluated, it is seen that the students of the departments who received limited mathematics education during their high school have severe problems in the process of online Mathematics education. Additionally, students with an excellent mathematical background are better adapted to the online education process.

The opinions about the distance education process of students who take mathematics lessons in the form of distance education and the problems encountered in this process, and also some suggestions are presented below for the distance education platform to be more efficient on behalf of learners and teachers:

1. The transition to distance education with the problems caused by the Covid-19 pandemic in education has affected all educational institutions, including higher education. At this point, all institutions should check how ready they are for this change,
2. Technological tools to be used in mathematics education should be developed to be efficient for students, and the necessary preparations should be made before education.
3. Mathematics education programs should be organized and implemented according to the distance education process, not in the face-to-face education process.
4. Different teaching methods and techniques should be developed in which students will be transferred from passive to active during online mathematics education.
5. Studies show that students understand less by only seeing (reading on presentations, etc.) mathematics during distance education. In this context, strengthening a learning, especially mathematics educators, should pay attention to choosing tools and materials (graphic tablet, etc.) which may help applied learning.
6. In the evaluations, mostly students' time shortage is shown as a critical factor. To avoid this problem, mathematics educators may need to pay attention to the compatibility of exam times and the number of questions and to prepare questions by considering the students' levels.
7. Care should be taken to ensure that the evaluations of mathematics lessons in the distance education process are process oriented. Otherwise, students cannot be prevented from exhibiting behaviours such as cheating. Considering the process-oriented evaluations, the validity and reliability of the evaluations can rise to a higher level.
8. Mathematics sometimes appears as a lesson that intimidates students. To prevent this, it can be considered that educators include more applications in classes, sharing alternative studies with students through the distance education platform, and sharing different mathematical software (Wolfram, Desmoss, etc.) that can help students while solving questions during lessons.

REFERENCES

Akdemir, Ö., Biçer, D., & Parmaksız, R. Ş. (2020). Information and Communications Technology Metaphors. *Mediterranean Journal of Social & Behavioral Research, 4*(1), 11-18.

Almanthari, A., Maulina, S., & Bruce, S. (2020). Secondary school mathematics teachers' views on E-learning implementation barriers during the COVID-19 pandemic: the case of Indonesia. Eurasia Journal of Mathematics, Science and Technology Education, 16(7).

Caldwell, E. R. (2006). A comparative study of three instructional modalities in a computer programming course: Traditional instruction, web-based instruction, and online instruction. The University of North Carolina at Greensboro.

Candarli, D., & Yuksel, H. G. (2012). Students' perceptions of video-conferencing in the classrooms in higher education. Procedia-Social and Behavioral Sciences, 47, 357-361.

Chen, T., Peng, L., Yin, X., Rong, J., Yang, J., & Cong, G. (2020). Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. In Healthcare, 8(3).

Chiu, T. K. (2021). Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic. Journal of Research on Technology in Education, 1-17.

Galligan, L., Loch, B., McDonald, C., & Taylor, J. A. (2010). "The use of tablet and related Gazi Üniversitesi Bilişim Enstitüsü, Ankara.

Gürer, M., Tekinarslan, E., & Yavuzalp, N. (2016). Opinions of instructors who give lectures online about distance education. Turkish Online Journal of Qualitative Inquiry, 7(1), 47-78.

Inan, F., Yukselturk, E., Kurucay, M., & Flores, R. (2017). The impact of self-regulation strategies on student success and satisfaction in an online course. International Journal on E-learning, 16(1), 23-32.

Jones, D. (1996). Computing by distance education: Problems and solutions. ACM SIGCSE Bulletin, 28(SI), 139-146.

Lee, Y., & Choi, J. (2011). A review of online course dropout research: Implications for practice and future research. Educational Technology Research and Development, 59(5), 593-618.

Papadopoulos, P. M., Demetriadis, S. N., Stamelos, I. G., & Tsoukalas, I. A. (2011). The value of writing-to-learn when using question prompts to support web-based learning in ill-structured domains. Educational Technology Research and Development, 59(1), 71-90.

Santana De Oliveira, M. M., Torres Penedo, A. S., & Silva Pereira, V. (2018). Distance education: advantages and disadvantages of the point of view of education and society. Dialogia, (29), 139-152.

Sarikaya, H., & Yarimsakalli, M. S. (2020). The students' view for teaching numerical analysis in the form of distance education. World Journal on Educational Technology: Current Issues, 12(4), 348-360.

Silverman, D., & Data, I. Q. (2001). Methods for analysing talk, text and interaction.

Tamah, S. M., Triwidayati, K. R., & Utami, T. S. D. (2020). Secondary school language teachers' online learning engagement during the COVID-19 pandemic in Indonesia. Journal of Information Technology Education: Research, 19, 803-832.

Tonbuloğlu, B., & Gürol, A. (2016). Analysis of distance education students'opinions and satisfaction levels of their programs. European Journal of Open Education and E-learning Studies.