International Journal of Learning and Teaching

Volume 13, Issue 1, (2021) 42-53 www.ij-lt.eu

Examination of opinions of elementary school students on Mathematics course in the COVID-19 pandemic process

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Suggested Citation:

Tezer, M., Cavus, S., Orkun, M. A. & Ture, A. (2021). Examination of opinions of elementary school students on Mathematics course in the COVID-19 pandemic process. *International Journal of Learning and Teaching. 13*(1), 42–53. https://doi.org/10.18844/ijlt.v13i1.5279

Received from October 05, 2020; revised from November 10, 2020 ; accepted from January 20, 2021;
Selection and peer review under responsibility of Prof. Dr. Jesus Garcia Laborda, University of Alcala, Spain

Abstract

In this study, it was aimed to examine the opinions of elementary school students in COVID-19 pandemic process on mathematics course. The participants of the study were fifth-grade elementary school students enrolled at elementary schools affiliated with Northern Cyprus. In this study, the descriptive research and surveying methods were used. As a data collection tool, the questionnaire developed by the researchers in this study was used. As a result of the research, it was seen that the motivation of the teacher was not an important factor in students' efforts to understand mathematics. In addition to this result, the motivation of the mathematics teacher to learn the class during the pandemic period did not affect the students' private lessons. In addition, it was revealed that the teachers' motivation for the students does not mean that the students will make more effort to understand the class, and that this is not a reason for students to take private lessons.

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1. Introduction

The fact that the importance of knowledge is rapidly increasing globally and that the age we are living in is an age of information and, advancements in technology, the differentiation in the concepts of democracy and management changes the skills that societies expect from individuals so as to adapt to these changes. As in every field, change is also required in the field of mathematics education. In daily life, the need to be able to use and understand mathematics is increasing and gaining importance. In our changing world, those who understand and practice mathematics have more options in shaping their future. With changes, mathematics and its education have to be redefined and reviewed in line with the determined needs (Attard & Holmes, 2020).

Mathematics covers the basic knowledge and skills that will help us to correctly perceive the events and facts related to the nature and society we live in, to understand relationships and to gain control over them. It is a common product of humanity and contains interesting patterns and relationships to be discovered (Gokalp, 2020). Although mathematics is one of the basic courses of primary education, it is one of the courses with low success in Syria as in some countries (Ciftci & Yildiz, 2019). Mathematics class in schools has become the nightmare of many students (Sertoz, 1998). Some of the reasons for this are that students' success in mathematics class is largely related to being intelligent, mathematics subjects taught from the second stage of primary education becoming abstract and detached from daily life, intense and boring teaching programmes and some negative teacher behaviours (Cai et al., 2019). These situations can lead to negative opinions about mathematics. Along with these negative opinions, it is observed that the mathematical achievement of students also decreased. National and international reports prepared show that students' mathematics achievement is at a very low level (Kiwanuka et al., 2020).

There may be several factors behind the negative attitudes and beliefs of students about, and as a result, their failure in mathematics. Among these, anxiety and general individual factors, such as fear, attitude and motivation, can be listed; in addition, there may be several external factors like teacher, education level of the family, difficulty level, teaching method and environmental pressure (Baki, 2008).

How important the students consider mathematics class and their approaches on this subject also positively affect their mathematics attitudes. As a matter of fact, in the study conducted by Baris and Dogan (2010), the predictive levels of Turkish students who took the TIMSS-1999 and TIMSS-2007 exams in terms of attitude, self-efficacy and value were examined. It was found that students' mathematics attitudes improved significantly in terms of valuing mathematics or perceiving its importance. Considering this aspect, it is very important for the students to perceive themselves as successful in that course in order to develop a positive attitude towards mathematics. In addition, it is undisputed that the support of the student's teacher, parents and the environment in which he/she communicates will contribute to the student's positive attitude towards the course. Otherwise, the student will have a negative attitude towards the course. It is possible for students who develop a positive or negative attitude towards mathematics to transfer it to further education levels (Birgin & Demirkan, 2017).

Although motivation is one of the key points in student success in every course, it is also a concept which bears importance in mathematics education. The mathematics course, in which abstract concepts are expressed with symbols, is expressed by most students as an overwhelming, disturbing and unpopular course. Mathematics motivation can be expressed as students' enthusiasm to learn mathematics classes and actively participate in activities involving mathematics (Ispir et al., 2011). When the literature is reviewed, it has been concluded that there is a positive significant relationship between mathematics achievement and mathematics motivation in the studies conducted (Cutter & Asilioglu, 2017; Uredi & Uredi, 2015; Yildirim, 2011). Students with high mathematics motivation are interested in research, questioning and all kinds of activities related to mathematics. On the other hand, students with low motivation are reluctant and closed to

learning, and the situation causes the students to develop a negative attitude towards mathematics after a while (Cutter, 2018). According to Tahir and Cakiroglu (2014), students develop a negative attitude towards mathematics before they encounter mathematical issues. A student who develops a prejudice towards mathematics in this way loses his will to study, and he also inhibits his inner motive situation. A student who thinks 'I cannot do it even if I study' does not spare enough time and effort to learn mathematical topics. Individuals who are successful in mathematics are described as intelligent in our society, and it is assumed that students who are successful in mathematics are successful in every field. Due to this taboo, students who fail in mathematics class describe themselves as unsuccessful and poorly intelligent, and this situation is reflected in other courses. Therefore, motivation in mathematics affects success of students in other courses, as well as affecting their success in mathematics (Uzel et al., 2018).

The cognitive learning theory, which emerges in response to behavioural theories, values students' internal processes that can be observed and measured indirectly instead of directly observed behaviours. In the cognitive approach, which refers to the importance of perception and cognitive processes in learning, motivation is an important component of learning. Motivation, which is a prerequisite for learning, increases the level of perception of the individual and determines which of the complex stimuli in the environment to pay attention to (Kaplan, 2007). The student with high motivation is ready to learn, but the student who is not motivated enough is bored and unwilling, so the desired learning cannot be achieved (Ulusoy, 2008).

In the context of students' having positive thoughts about mathematics lesson, it is recommended to offer to students the opportunities to motivate students to participate in learning processes and activities, to gain self-confidence, to experience a sense of learning and success, to attract their attention and attention, to express and share their ideas and opinions in a democratic environment, to communicate effectively by interacting with teachers and peers, learning together, taking responsibility and feeling of solidarity (Birgin et al., 2017). Gunuc (2014) found that there is a positive relationship between student'' participation in class and their academic achievement. Mentes (2011) found that there is a positive and significant relationship between students' trust in their teachers and their commitment to classes. Kaya (1995) found that there is a strong relationship between students' motivation and self-confidence and their participation in the course.

Coronavirus (COVID-19), which first appeared in Wuhan, China's Hubei Province, at the end of December 2019, spread rapidly. It started to become a global pandemic as a result of the World Health Organisation classifying it as an 'international public health emergency' on January 30 (Budak & Korkmaz, 2020). COVID-19 has negatively affected the education sector and especially the health sector (Yamamoto & Altun, 2020). According to the latest data from the United Nations, 770 million educated people in the world are negatively affected by the closure of schools and universities due to the pandemic (Zhong, 2020). Students studying in Northern Cyprus have also been adversely affected by this pandemic.

The pandemic disease called COVID-19, which spread all over the world in the 2019–2020 academic year, arrived to Northern Cyprus, as a result of which the education and training process was negatively affected. With regard to this process, some measures have been taken in order to not interrupt the education. As a result, besides face-to-face education, the concepts of computer-aided education and distance education have come to light. In order to eliminate this deficiency, education was continued with the hybrid teaching method by the Ministry of Education. In order to continue school–teacher–parent cooperation and communication, WhatsApp groups were created by teachers on class basis. The technical infrastructure was strengthened by the Ministry of National Education and Culture, and live classes started. In this way, in addition to the face-to-face training of teachers and students, live classes were carried out in electronic environment.

Teachers at education institutions mostly complained about the failure of students, their unwillingness to attend classes, negative attitudes developed against the course and the anxiety of students towards courses. This anxiety and motivation problem developed towards mathematics course decreases the academic success

of students. For this reason, it is extremely important that students have positive opinions towards mathematics course. In light of the findings to be obtained in the end of this study, it is believed that the success of students will increase if they have positive opinions on mathematics course so that schools which educate students can provide education and training more effectively. The objective of this research is the examination of opinions of elementary school fifth-grade students in the pandemic process as regards the mathematics course.

2. Research method

The survey model was used in this research and was conducted within the framework of quantitative research approach. The survey model is a research approach that aims to describe a past or present situation as it exists (Buyukozturk et al., 2017).

2.1. Participants

Participants of this study are students enrolled at elementary schools affiliated with the Ministry of National Education and Culture in Northern Cyprus in the 2020–2021 academic year. The research did not use any sampling method. Due to the pandemic, after obtaining permission from the school administration and the families of the students, 216 students were asked to fill in the questionnaire online with the help of their families and teachers. Considering the gender of the students participating in the study, it was understood that 126 (58.3%) of the students were girls and 90 (41.7%) of them were boys.

2.2. Data collection tool

In the research, data were collected using the questionnaire developed by the researchers as a data collection tool. This form consisted of eight items: sex, taking private lessons, seeing oneself successful, feeling the need for help in mathematics course, having difficulty in understanding mathematics course, paying effort to understand the course, enjoying studying the course, classes, materials and homework given being adequate, and motivation by the teacher. The questionnaire 'The opinions of primary school students towards the mathematics class during the COVID-19 pandemic period' was applied to the students after the face validity, suitability and reliability of the students in line with the opinions of experts and classroom teachers working in the field.

2.3. Collection of data

Necessary ethical permissions were obtained from Near East University Institute of Educational Sciences and the Ministry of National Education and Culture (MEKB) of Northern Cyprus in order to carry out the research. Afterwards, the data were obtained by completing the questionnaire on Google Forms within 10–15 minutes on the days and hours when they were available for students studying at elementary schools affiliated with MEKB.

2.4. Analysis of data

Statistical Package for Social Sciences SPSS 24.0 statistical software programme was used to analyse the research data after they were obtained. In all statistics, the significance level value was taken as 0.05.

While frequency and percentage values were used in the analysis of the data in the study, chi-square tests were used for cross tables among non-parametric tests to test the significant difference of cross tables between categorical variables (Buyukozturk et al., 2017).

3. Results

In this section, findings related to the purpose of the research are included in addition to the demographic information of the students. Table 1 contains information about the students participating in the research to receive additional classes, support or private lessons during the pandemic period.

Table 1. Distribution as regards students taking private lesson

Taking additional lesson/private lesson	*N*	%
Yes	71	32.9
No	145	67.1
Total	216	100.0

Distribution as regards students taking private lesson is given in Table 1. When Table 1 is examined, it can be seen that despite the risks experienced in the pandemic, 32.9% of the students took private lesson, supporting lesson or additional lesson and 67.1% did not take private lesson, supporting lesson or additional lesson. Majority of the students who participated in the research did not take private lesson.

Table 2. Distribution as regards students seeing themselves as successful at mathematics course

Seeing oneself as successful	*N*	%
Yes	207	95.8
No	9	4.2
Total	216	100.0

The distribution as regards students seeing themselves as successful at mathematics course is given in Table 2. When Table 2 is examined, it can be seen that despite the risks in the pandemic, 95.8% of the students participating in the study saw themselves as successful at mathematics course, whereas 4.2% did not see themselves as successful. Approximately, all of the students who participated in the study saw themselves as successful in the mathematics course in the pandemic process.

Table 3. Distribution of how often students need help while doing their mathematics homework

Needing help	*N*	%
Never	37	17.1
Occasionally	162	75.0
Always	17	7.9
Total	216	100.0

The distribution as regards the frequency of students needing help in doing their mathematics homework is given in Table 3. When Table 3 is examined, it can be seen that, despite the risks experienced in the pandemic, 75% of the students participating in the questionnaire occasionally needed help, 17.1% never needed help and 7.9% sometimes needed help while doing their mathematics homework. A significant majority of students who participated in the study needed help while doing their homework in the pandemic period.

Table 4. Distribution as regards students having difficulty in understanding mathematics course in the pandemic (COVID 19) period

Having difficulty in understanding	*N*	%
Yes	43	19.9

Partially	98	45.4
No	75	34.7
Total	216	100.0

The distribution as regards students having difficulty in understanding mathematics course in the pandemic (COVID 19) period is given in Table 4. When Table 4 is examined, it can be seen that after education is given using a hybrid method due to pandemic, students participating in the questionnaire had difficulty in understanding mathematics course partially at 45.4% ratio, whereas 34.7% did not have difficulty and 19.9% had difficulty in understanding mathematics course. Approximately, half of the students who participated in the study stated that they had difficulty in understanding the mathematics course partially.

Table 5. Distribution as regards the efforts of students for understanding mathematics in the pandemic (COVID-19 disease) period

Paying effort to understand	*N*	%
Yes	149	69.0
Partially	50	23.1
No	17	7.9
Total	216	100.0

Distribution as regards students paying effort to understand mathematics in the pandemic (COVID-19) period is given in Table 5. When Table 5 is examined, it can be seen that after education is given using a hybrid method due to the pandemic, students participating in the questionnaire made an effort to understand mathematic course at 69% ratio, whereas 23.1% made an effort partially and 7.9% did not make an effort to understand the mathematics course. A significant majority of the students participating in the study stated that they made an effort to understand the mathematics course in the pandemic process.

Table 6. Distribution as regards students enjoying studying mathematics in the pandemic (COVID-19) period

Enjoying studying	*N*	%
Yes	90	41.7
Partially	90	41.7
No	36	16.7
Total	216	100.0

The distribution as regards students enjoying studying mathematics course in the pandemic (COVID-19) period is given in Table 6. When Table 6 is examined, it is seen that despite the problems experienced in the pandemic period, 41.7% of the students enjoyed studying, 41.7% partially enjoyed studying and 16.7% did not enjoy studying. A majority of the students who participated in the study enjoyed or partially enjoyed studying.

Table 7. Distribution as regards the adequacy of courses, materials and homework in mathematics courses in the pandemic (COVID-19) period

Course, material and homework being adequate	*N*	%
Yes	111	51.4

Partially	69	31.9
No	36	16.7
Total	216	100.0

The distribution as regards student opinions on the inadequacy of the course, material and homework given to them in the mathematics course during the pandemic (COVID-19) period is given in Table 7. When Table 7 is examined, it is observed that despite the problems experienced during the pandemic period, 51.4% of the students participating in the questionnaire thought that the course, material and homework given to them were adequate, 31.9% of the students thought that the course, material and homework given to them were partially adequate and 16.7% of the students thought that the course, material and homework given to them in the mathematics course were not adequate. Only half of the students participating in the study stated that the course, material, and homework given to them in the mathematics course were adequate.

Table 8. Distribution as regards the motivation of students by their mathematics teacher in the pandemic (COVID-19) period

Motivation by the teacher	*N*	%
Yes	124	57.4
Partially	60	27.8
No	32	14.8
Total	216	100.0

The distribution of mathematics teachers' motivation according to students' views during the pandemic (COVID-19) period is given in Table 8. When Table 8 is examined, despite the problems experienced during the pandemic period, 57.4% of the students who participated in the survey stated that their teachers motivated them in mathematics course, 27.8% stated that their teachers partially motivated them in mathematics course and 14.8% of them stated that their teachers did not motivate them in the course.

Table 9. The status of having difficulty in understanding the course according to them feeling the need for help in mathematics course – Chi-square test

Frequency of needing for help		Having difficulty in understanding the course				χ^2	Asymp. Sig (p)
		Yes	Partially	No	Total		
Never	*n*	6	10	21	37	22.315[a]	0.001
	%	16.2%	27.0%	56.8%	100.0%		
Occasionally		28	82	52	162		
		17.3%	50.6%	32.1%	100.0%		
Always	*n*	9	6	2	17		
	%	52.9%	35.3%	11.8%	100.0%		
Total	*n*	43	98	75	216	$p < 0.05$	

	%	19.9%	45.4%	34.7%	100.0%

As a result of the chi-square test carried out in Table 9, when the difficulty in understanding the class is examined according to the students' need for help in the mathematics class, the fact that the *p* value was found to be less than 0.05 reveals and confirms that there is a statistical difference. Thirty-seven students included in the study stated that they did not need help in the mathematics class during the pandemic period, while 56.8% of these students stated that they did not have difficulty understanding the class. On the contrary, 17 students stated that they needed help in mathematics during the pandemic period, while 52.9% of these students stated that they had difficulty understanding the class.

Table 10. Difficulty in understanding the course according to students' need for help in mathematics class – Chi-square test

Difficulty in understanding the course		Paying effort in understanding the course				χ^2	Asymp. Sig (*p*)
		Yes	Partially	No	Total		
Yes	*n*	26	14	3	43	24.017[a]	0.001
	%	60.5%	32.6%	7.0%	100.0%		
Partially		73	25	0	98		
		74.5%	25.5%	0.0%	100.0%		
No	*n*	50	11	14	75		
	%	66.7%	14.7%	18.7%	100.0%		
Total	*n*	149	50	17	216	$p < 0.05$	
	%	69.0%	23.1%	7.9%	100.0%		

As a result of the chi-square test carried out in Table 10, when examining the students' efforts to understand the class according to their difficulties in understanding the class in mathematics, the *p* value found to be less than 0.05 reveals and confirms the statistical difference. While 43 students included in the study stated that they had difficulty in understanding mathematics during the pandemic period, 60.5% of these students also stated that they made an effort to understand the class. Similarly, 74.5% of 75 students who were included in the study did not have difficulty understanding the class and 74.5% of 98 students who had difficulty understanding the class stated that they made an effort to understand the mathematics class during the pandemic period.

According to the chi-square test conducted between 'adequacy of the course, materials and homework given to students' and 'taking additional lecture, support or private lesson' in the pandemic (COVID-19) period, no significant difference was found ($p > 0.05$). This means that the adequacy of the course, materials and homework given to students did not serve as a factor in the students taking private lessons.

According to the chi-square test conducted between 'students' efforts to understand mathematics' and 'mathematics teachers motivating students to learn the course' in the mathematics class in the pandemic (COVID-19) period, no significant difference was found ($p > 0.05$). In other words, teacher motivation was not an important factor in students' efforts to understand mathematics.

According to the chi-square test conducted during the pandemic (COVID-19) period, there was no significant difference between 'taking additional lessons, support lessons or private lessons' and 'mathematics teachers motivating students to learn the course' ($p > 0.05$). In other words, the motivation by the mathematics teacher on the students to learn the course did not affect the students taking private lessons.

4. Discussion

When the situation of students regarding taking private lessons was examined, it was seen that most of the students participating in the study did not take private lessons. However, in the previous years, the rate of taking private lessons has reached up to 50% (Ekizoglu & Tezer, 2009). According to Rutz and Balkan (2016), in countries where competition is effective in the transition between education levels, the tendency to continue private tutoring, study centres and private lessons is increasing. In other words, the competition among individuals to pass each other increases the demand for private lessons and study centres. However, in this research, it was observed that there was a decrease in the rate of attending private lessons or courses compared to previous years due to the pandemic.

Almost all of the students participating in the study consider themselves as successful in mathematics during the pandemic period. A significant majority of the students participating in the study needed help while doing their mathematics homework during the pandemic period. It is important for students to express themselves successfully with the necessary assistance in mathematics education carried out during the pandemic period in Northern Cyprus. A student who has a high belief that he/she can do mathematics is likely to have a high mathematics achievement. In many studies, the relationship between mathematics achievement and number sense suggests that number sense may also be related to self-efficacy perception (Sevgi & Yakisikli, 2020).

Almost half of the students participating in the study stated that they had partial difficulty in understanding the mathematics class during the pandemic period. There is a positive and significant relationship between the middle school grade point average given by the students in order to understand the mathematics class and their middle school success score average. In this case, we can claim that the success level of students in middle school depends on their good understanding of mathematics subjects. In other words, the mathematics achievement score of a student who can comprehend the mathematical subjects described in the classroom may increase (Ekizoglu & Tezer, 2009; Kukey & Tutak, 2019). A significant majority of the students participating in the study stated that they made an effort to understand the mathematics class during the pandemic period.

Even during the pandemic period, the research findings showed that most of the students enjoyed or partially enjoyed studying mathematics. According to the results of the study conducted by Ramadhanty and Usman (2019) on the effects of learning environments, learning habits and motivation on college students in Jakarta, there is a statistically significant difference between studying habits and learning (Ramadhanty & Usman, 2019). In this case, it can be stated that as a result of students enjoying studying mathematics during the pandemic period, most of them will be successful with the realisation of the learning at the end of the academic year.

As a result of this research, only half of the students stated that the classes, materials and homework given to them in the mathematics course were adequate. Demir (2019) also stated in his research that the use of effective materials will increase success.

During the pandemic (COVID-19) period, more than half of the students stated that the mathematics teacher motivated them. In this study, very few student groups argued that teachers did not motivate them in

mathematics classes. Suren (2019) stated as a result of his research that students' motivation towards mathematics affected their academic achievement in mathematics course. The common emphasis of different studies (Pintrich & Schunk, 1996; Ulucay, 2017) indicating that students with high motivation towards mathematics also have high success in mathematics is that there is a positive relationship between mathematics achievement and motivation towards mathematics.

Another result of this study is that there is a significant relationship between students' need for help in mathematics class and their difficulties in understanding the mathematics class. Again, the students stated that they tried to understand the class as they had difficulty understanding the class in mathematics. Similarly, it was stated with the research that students' success levels in secondary school are related to their good understanding of mathematics subjects (Ekizoglu & Tezer, 2009).

As a result of this research, it has been observed that the classes, materials and homework given to the students during the pandemic period are not effective in taking private lessons. Again, as a result of the research, the motivation of the teacher was not an important factor in the students' efforts to understand mathematics. In addition to this result, the motivation of the mathematics teachers to learn the class during the pandemic period was not a factor in the students taking private lessons. In their study, Akdemir and Kilic (2020) concluded that students believe that they will be successful because they receive classes appropriate to their level in the private lesson, and they can communicate effectively and sincerely with their teachers; in this context, they participate actively in the class and can ask questions comfortably. In addition, it was concluded that some students thought that private lesson learning environments made learning enjoyable and increased permanence, and some students perceived learning as a necessity and felt pressure because they had to give instant feedback in the private lesson and felt responsible for their parents / teachers. Therefore, as a result of this research, it has been revealed that the motivation of the students by the teacher does not mean that the students will make more effort to understand the class, nor is it a justification for students to take private lessons.

5. Conclusion

As a result, it was seen in this research that most of the students did not take private lessons during the pandemic period, and there was a decrease in the rate of attending private lessons or courses due to the pandemic compared to the previous years. During the pandemic period, students imagined themselves as successful in mathematics classes. A significant majority of the students needed help while doing their mathematics homework during the pandemic period. A significant portion of the students had difficulty understanding the mathematics class during the pandemic period, but a majority of them enjoyed studying mathematics. While the students stated that the class, materials and homework given to them in the mathematics class were not adequate, many students stated that the mathematics teacher motivated them and they turned to help in case of difficulties in the mathematics course.

It was seen in this research that the fact that the classes, materials and homework given to the students during the pandemic period were not effective in taking private lessons. Again, as a result of the research, teachers' self-motivation was not an important factor in students' efforts to understand mathematics. In addition to this result, the motivation of the mathematics teachers to learn the class during the pandemic period was not a factor in students taking private lessons. In addition, it was revealed that the teacher's motivation of the students does not mean that the students will make more effort to understand the class, nor is it a justification for students to take private lessons.

6. Recommendations

From this research, it can be observed that most of the students did not take private lessons during the pandemic period and there was a decrease in the rate of attending private lessons or courses due to the

pandemic compared to the previous years. It was obvious that the reason for this decrease was the isolation measures taken. Teachers should pay attention to the teaching methods in order to not decrease student success due to fewer private lessons. Since it is seen that a significant majority of students need help while doing their mathematics homework during the pandemic period, teachers should provide the necessary assistance to their students during the class, and when the homework is given, it is necessary to give the homework that can be done by paying attention to the student's level of knowledge. Students should be given adequate courses, materials and homework in mathematics class. This will make it easier for them to understand the course.

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