

# The Views of Middle School Students on Distance and Face-to-Face Education on Mathematics Education during the Covid-19 Pandemic

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## Abstract

The spread of the Covid-19 all over the world have negatively affected many areas, leading to a number changes throughout the world. Being one of these areas, education had to undergone some changes and shifted to distance education during the Covid-19 pandemic. However, distance education has also brought some discussions and problems. This study was carried out to investigate the thoughts of middle school students on distance education and face-to-face education. Based on quantitative research design, this study adopted a phenomenological design Data were collected from a participant group consisting of 240 secondary school students (60 5th grade, 60 6th grade, 60 7th grade and 60 8th grade) through a scale prepared by the researchers. The data were analyzed using SPSS package program with descriptive statistics such as frequency and percentage. As a result of the study It was found that middle school students' views on distance education and face-to-face education differed significantly with regard to parents' education level, gender, grade level and average monthly family income.

**Keywords:** Covid-19, Distance Education, Mathematics Education, Middle School Students

The Covid-19 pandemic is one of the largest pandemics experienced in the world since the 1918 Spanish Flu and therefore it is considered the largest global pandemic of the last 100 years (Qadir & Al-Fuqaha, 2020). Covid-19, which was first detected in Wuhan, Hubei, China in December 2019, began to spread worldwide, and the World Health Organization (WHO) declared this virus as a “pandemic” on March 11 (WHO, 2020). Accordingly, Covid-19 pandemic paved the way to a crisis that severely influenced the world. Contrary to economic or financial crises, the effects of Covid-19 and related crises do not only have economical consequences, but also have sociological and psychological outcomes. With the increase of the pandemic, people tried to self-isolated themselves with the motto “Stay at Home” and new generation online interaction tools emerged. In a short time, most of the services such as entertainment, shopping, conferences and even education became digital. Certainly, education was one of the sectors most affected by the digitalization caused by Covid-19, and face-to-face education at all levels from preschool education to higher education all over the world had to be replaced by distance education (Ak, Şahin, Çiçek, & Ertürk, 2020; Yükselir & Yuvayapan, 2021).

Distance education first started in America in the 1700s through letters. At that time, written course materials were sent by mail. With the invent of radio-television and cinema, multi-media features were included in the distance

education. Finally, computer and internet technologies facilitated the distance education, making it more useful (Ergüney, 2015). Distance education refers to a modern and effective form of learning that can be offered whenever and wherever, provides the opportunity to tailor educational materials electronically and flexibly, and enables updating and adding different technologies to the learning process (Altun & Telli-Yamamoto, 2020). Distance education has been carried out using tools such as television and/or radio broadcasts, printed teaching materials, online teaching contents or interactive synchronous lessons in line with the technological infrastructure, economic opportunities and geographical conditions of the countries. In addition, many countries around the world have searched for ways to decrease the negative effects of students staying at home for a long time. Accordingly, as well as offering asynchronous courses through the internet or television, it was ensured that teachers and students met in a virtual environment through interactive synchronous courses. Online communication opportunities were provided in order to enable teachers to interact with students and students with their peers. In this sense, developing distance education platforms for students in order to ensure the sustainability of education and training is considered as having a crucial importance (Sözen, 2020).

COVID-19 has badly affected the education industry in that school closures during the pandemic disrupted the face-to-face education of more than 1.6 billion students in the world. In January 2021, UNESCO reported that more than 234 million pupils in 33 countries continue to be influenced by school closures, equating to more than 13 percent of all students throughout the world (USAID, 2021). Turkey was also negatively affected by the Covid-19 pandemic and adopted distance education. In Turkey, 24,901,925 students were affected by school closures due to the Covid-19 pandemic (UNESCO, 2020). The Ministry of National Education (MEB) gradually switched from distance education, which was first started on March 23, 2020, to face-to-face education on 02.03.2021. In this context, 2 days a week face-to-face 3 days a week in primary schools in provinces in all risk groups, 5th, 6th and 7th grades in middle schools in low and medium risk

provinces 2 days a week face-to-face 3 days a week, and 8th grades of middle schools in all risk groups. In cases where the class size is crowded and the class is divided, it has been announced that face-to-face training will be provided for 12 lessons per week, and in other cases 22 lesson hours a week. In this context, education in primary schools in all cities was carried out face-to-face 2 days a week, and distance 3 days a week. Similarly, it was decided to provide face-to-face education 2 days a week and distance education 3 days a week in the 5th, 6th and 7th grades of middle schools in low and medium risk cities. Finally, it was announced that face-to-face education will be conducted in 8th grades in all cities, 12 lesson hours a week in cases where the class was crowded and the class needed to be divided, and 22 lesson hours a week in other cases. In addition, it was stated that all of the courses and activities, apart from face-to-face education at all grade levels, would be offered through distance education. In addition to applications enabling synchronous courses, EBA TV and EBA Portal was used during the distance education (MEB, 2021).

Teachers, students and parents experienced a situation they had not been familiar with because distance education was suddenly applied as a typical and basic education method from pre-school to university (Karaca, Karaca, Karamustafaoglu, & Özcan, 2021). COVID-19 revealed a lack of skills among teachers and the infrastructure required to provide distance and/or online education of good quality. Many teachers had to use the existing skills and resources to get into contact with students and support their learning. Although the pandemic negatively affected teachers' confidence, motivation and incomes, less than a third of the countries in the world offered psycho-social support to teachers (Global Partnership for Education, 2021; Kara & Kalay-Usta, 2021). Distance education refer to any form of learning where individuals are not physically present in a traditional setting such as the classroom. Although such a learning approach offers many advantages over traditional learning (Thoms & Eryılmaz, 2014), some put forward that distance education increases inequality in education. First, the inequalities in accessing the digital tools used in the distance education and the possibility that students

may not benefit from the support provided by the schools due to some disadvantages led to a significant amount of debate. In addition, distance education prevented the students to engage in a number activities and practices that affect not only education but also personal development such as socialization, sports and cultural activities. Despite these global developments, today’s children grow up in a world where mathematics is effective in every aspect of life, and the foundations of rapidly developing technology depend on mathematical knowledge. Also, numerous educational and career opportunities require mathematical expertise. Similarly, individuals need mathematical calculations and analyzes for their daily work (Haylock & Thangata, 2007; Kilpatrick, Swafford, & Findell, 2001).

As mathematics education is quite important for students, the question of whether students better understand mathematics education through face-to-face or distance education remains to be answered. Therefore, the present study aims to address this question.

**Method**

In this part, the aim, method, scope of the study, reliability analysis and the findings are presented respectively.

**The Aim of the Study**

This study aimed at comparing the views of middle school students on distance education and face-to-face education.

**The Method of the Study**

This study adopted phenomenology design. Phenomenology design is used to reveal underlying information of a phenomenon (Husserl, 2020). It also aims to reveal the experiences of individuals about a phenomenon and the meaning they attribute to these experiences (Creswell, 2015).

**Study Group**

The study group consisted of a total of 240 students studying in middle schools in a city in the southeast of Turkey. Of the participants, 60 were selected from the 5th grade, 60 from the 6th grade, 60 from the 7th grade and 60 from the 8th grade.

Convenience sampling was adopted as the sampling method. Participation to the study was on a voluntary basis.

**The Scope of the Study**

The scope of this study consisted of a total of 240 students studying in middle schools in a city in the southeast of Turkey. Of them, 60 were from the 5th grade, 60 from the 6th grade, 60 from the 7th grade and 60 from the 8th grade. A scale was applied to all of these 240 participant through the “Google Forms” and all participants completed the scale.

**Data Collection Tool**

The researchers developed the used in the study (Appendix 1). The scale consists of two parts. The first part consists of 5 questions to obtain participants’ demographic information. The second part includes 16 items aiming to obtain and compare the views of students on both distance education and face-to-face education. The data were analyzed using SPSS package program with descriptive statistics such as frequency and percentage.

**Reliability Analysis**

Cronbach’s Alpha analysis was used for the reliability of this scale prepared by the researchers. The Cronbach’s Alpha coefficient of the scale was found to be 0.83 Bayram (2017) stated that the reliability coefficient of 70% and above is a satisfactory reliability level in social sciences.

**Findings**

This study was carried out to compare the views of middle school students between distance education and face-to-face education. Therefore, a scale was applied to 240 participants via Google Forms. The findings obtained from the scale are presented in Tables below. The participants’ demographic information is shown in Table 1.

**Table 1 The Mean and Standard Deviations of the Variables**

| Variables | N   | Mean | Standard deviation |
|-----------|-----|------|--------------------|
| Grade     | 240 | 2.50 | 1.120              |
| Gender    | 240 | 1.40 | .490               |

|                           |     |      |       |
|---------------------------|-----|------|-------|
| Mother's education level  | 240 | 3.17 | 1.745 |
| Father's education level  | 240 | 4.22 | 1.447 |
| The monthly family income | 240 | 2.08 | 1.060 |

The means and standard deviations of the analyzed variables are presented in Table 1. The results of Independent samples t-test and ANOVA which were performed to reveal whether there was a significant difference between the data are shown in tables below. Table 2 demonstrates the frequency and percentage of the participants' views on distance education with regard to their mother's education level.

The educational level of the mothers revealed that 25% were illiterate, 17.9% were literate, 12.1% were primary school graduates, 15.4% were middle school graduates, 20.4% were high school graduates, 7.9% were university graduates, and

1.3% had postgraduate degree. ANOVA results of participants' views on distance education in terms of their mother's education level are presented in Table 3.

**Table 2 Opinions According to Mother's Education Level**

| Mother's education level | Frequency | Percentage |
|--------------------------|-----------|------------|
| 1                        | 60        | 25         |
| 2                        | 43        | 17.9       |
| 3                        | 29        | 12.1       |
| 4                        | 37        | 15.4       |
| 5                        | 49        | 20.4       |
| 6                        | 19        | 7.9        |
| 7                        | 3         | 1.3        |
| Total                    | 240       | 100        |

**Table 3 ANOVA Results of Participant Views by Mother's Education Level**

| Source of Variance | Sd  | Sum of squares | Mean squares | F     | p    | Difference  |
|--------------------|-----|----------------|--------------|-------|------|---|
| Intergroup         | 6   | 9.218          | 1.536        | 74.62 | .000 | 1-2, 1-3, 1-4, 1-5, 1-6, 2-3, 2-4, 2-5, 2-6, 3-6, 4-6, 5-6, 5-7,6-7 |
| Intra group        | 233 | 4.797          | .021         |       |      |   |
| Total              | 239 | 14.015         |              |       |      |   |

Table 3 showed that the F value was significant and thus there was a significant difference between the groups ( $F(6, 233)=74.62, p<.05$ ). The Tukey post-hoc test performed to determine the source of the difference revealed that a significant difference was found between the following groups: 1-2, 1-3, 1-4, 1-5, 1-6, 2-3, 2-4, 2-5, 2-6, 3-6, 4-6, 5-6, 5-7 and 6-7. The frequency and percentage of the participants' views on distance education with regard to their father's education level are presented in Table 4.

**Table 4 Opinions of Participants by Father's Education Level**

| Father's Educational Level | Frequency | %   |
|----------------------------|-----------|-----|
| 1                          | 13        | 5.4 |
| 2                          | 16        | 6.7 |

|       |     |      |
|-------|-----|------|
| 3     | 43  | 17.9 |
| 4     | 57  | 23.8 |
| 5     | 62  | 25.8 |
| 6     | 43  | 17.9 |
| 7     | 6   | 2.5  |
| Total | 240 | 100  |

The educational level of the fathers showed that 5.4 % were illiterate, 6.7 % were literate, 17.9 % were primary school graduates, 23.8 % were middle school graduates, 25.8 % were high school graduates, 17.9 % were university graduates, and 2.5 % had postgraduate degree. ANOVA results of participants' views on distance education with regard to their father's education level are presented in Table 5.

**Table 5 ANOVA Results of Participant Views by Father's Education Level**

| Source of Variance | Sd  | Sum of squares | Mean squares | F      | p    | Difference  |
|--------------------|-----|----------------|--------------|--------|------|---|
| Intergroup         | 6   | 9.850          | 1.642        | 91.840 | .000 | 1-4, 1-5, 1-6, 1-7, 2-5, 2-6, 2-7, 3-4, 3-5, 3-6, 3-7, 4-5, 4-6, 4-7, 5-6, 5-7, 6-7 |
| Intragroup         | 233 | 4.165          | .018         |        |      |   |
| Total              | 239 | 14.015         |              |        |      |   |

Table 5 demonstrated that the F value was significant and thus there was a significant difference between the groups ( $F(6, 233)=91.840, p<.05$ ). The Tukey post-hoc test performed to determine the source of the difference revealed that there was a significant difference between the following groups: 1-4, 1-5, 1-6, 1-7, 2-5, 2-6, 2-7, 3-4, 3-5, 3-6, 3-7, 4-5, 4-6, 4-7, 5-6, 5-7, and 6-7. The mean, standard deviation, t and p values of participants' views on distance education in terms of gender are presented in Table 6.

**Table 6 Values of Participants' Opinions by Gender**

| Gender | N   | Mean | S.D | t     | p    |
|--------|-----|------|-----|-------|------|
| 1      | 145 | 2.36 | .23 | 7.131 | .000 |
| 2      | 95  | 2.15 | .20 |       |      |
| Total  | 240 | 1.40 | .49 |       |      |

The independent samples t-tests results showed a significant difference between the views of female and male participants ( $p<.05$ ). It was found that the

**Table 8 ANOVA Results of Participant Opinions by Grade Level**

| Source of Variance | Sd  | Sum of squares | Mean squares | F      | p    | Difference                   |
|--------------------|-----|----------------|--------------|--------|------|------------------------------|
| Intergroup         | 3   | 9.038          | 3.013        | 142.88 | .000 | 1-2, 1-3, 1-4, 2-3, 2-4, 3-4 |
| Intragroup         | 236 | 4.976          | .021         |        |      |                              |
| Total              | 239 | 14.015         |              |        |      |                              |

The F value was found to be significant and thus there was a significant difference between the groups ( $F(3, 236)=142.88, p<.05$ ). The Tukey post-hoc test performed to determine the source of the difference demonstrated that there was a significant difference between the groups 1-2, 1-3, 1-4, 2-3, 2-4, 3-4. The frequency and percentage of the participants' views on distance education in terms of the monthly family income are presented in Table 9.

Table 9 shows that in terms of the average monthly family income, of 37.9% of the participants had 0-3000 TL of the average monthly income, 31.3% had 3001-5000 TL, 16.3% had 5001-7000

mean value of female participants was 2.36 whereas that of male participants was 2.15, indicating that this difference was in favor of female participants. The frequency and percentage of the participants' views on distance education with regard to grade level are given in Table 7.

**Table 7 Frequency and Percentage of Participants' Opinions by Grade Level**

| Grade Level | Frequency | Percentage |
|-------------|-----------|------------|
| 1           | 60        | 25         |
| 2           | 60        | 25         |
| 3           | 60        | 25         |
| 4           | 60        | 25         |
| Total       | 240       | 100        |

Table 7 shows that 60 (25%) of the participants were 5th grade students, 60 (25%) were 6th grade students, 60 (25%) were 7th grade students, and 60 (25%) were 8th grade students. ANOVA results of the participants' views on distance education with regard to grade level are presented in Table 8.

TL, and 14.6% had 7001 TL and above. Table 10 shows ANOVA results of the participants' views on distance education in terms of the average monthly family income.

**Table 9 Frequency and Percentage of Views by Monthly Income**

| The monthly family income | Frequency | %    |
|---------------------------|-----------|------|
| 1                         | 91        | 37.9 |
| 2                         | 75        | 31.3 |
| 3                         | 39        | 16.3 |
| 4                         | 35        | 14.6 |
| Total                     | 240       | 100  |

**Table 10 ANOVA Results of Participant Opinions with Monthly Income**

| Source of variance | Sd  | Sum of squares | Mean squares | F       | p    | Difference                      |
|--------------------|-----|----------------|--------------|---------|------|---------------------------------|
| Intergroup         | 3   | 9.620          | 3.207        | 172.195 | .000 | 1-2, 1-3, 1-4,<br>2-3, 2-4, 3-4 |
| Intragroup         | 236 | 4,395          | .019         |         |      |                                 |
| Total              | 239 | 14.015         |              |         |      |                                 |

Table 10 showed that the F value was significant and therefore there was a significant difference between the groups ( $F(6, 236)=172.195, p<.05$ ). The Tukey post-hoc test performed to determine the source of the difference demonstrated that there was a significant difference between the groups 1-2, 1-3, 1-4, 2-3, 2-4, 3-4.

**Discussion and Conclusion**

The present study investigated the middle school students’ views about distance education and face-to-face education and whether their views differ with regard to some variables. To do this, a scale was applied to 240 middle school students via Google Forms.

The examination of the participants’ views on distance education and face-to-face education with regard to the mother’s education level revealed that the participants whose mothers were illiterate had significantly lower values than those whose mothers were literate or had primary, secondary, high school, undergraduate and postgraduate degree. Similarly, it was found that the participants who had literate mothers had significantly lower values than those whose mothers had primary, secondary, high school and undergraduate degree. In addition, the participants whose mothers were primary school graduates had significantly lower values than those whose mothers had undergraduate degree; the participants whose mothers were secondary school graduates had significantly lower values than those whose mothers had undergraduate degree, the participants whose mothers were high school graduates had significantly lower values than those whose mothers had undergraduate and graduate degree and finally the participants whose mothers had undergraduate degree had significantly lower values than those whose mothers had graduate degree.

The analysis of the participants’ views on distance education and face-to-face education in terms of the father’s education level showed that it was found

that the participants whose fathers were illiterate had significantly lower values than those whose fathers had middle school, high school, undergraduate and graduate degrees. Similarly, it was found that the participants whose fathers were literate had significantly lower values than those whose fathers had high school, undergraduate and graduate degree. In addition, it was determined that the participants whose fathers were primary school graduates had significantly lower values than those whose fathers had middle school, high school, undergraduate and graduate degree; the participants whose fathers were middle school graduates had significantly lower values than those whose fathers had high school, undergraduate and graduate degree; the participants whose fathers were high school graduates had significantly lower values than those whose fathers had undergraduate and graduate degree and finally the participants whose fathers had graduate degree had significantly lower values than those whose fathers had graduate degree.

It is thought that the reason why the educational level of the parents was significantly different in the views of the participants is due to parents’ communication with the teacher and the guidance provided by parents in distance education. In this sense, as students spend most of their time in the school and with their family, the disagreement that potentially occur between parents and teachers when they do not communicate with each other may lead to conflicts in children (Ardakoç, 2020). In agreement with this view, Toran and Özgen (2018) revealed that the idea that parent-school cooperation is not regarded as important and effective by families with low educational level and socio-economic status is widespread. Furthermore, Başaran, Doğan, Karaoğlu and Şahin (2020) found in their study that parents as well as teachers experienced problems with regard to providing guidance to students during the pandemic; therefore, more effective implementations should be considered for offering

guidance in distance education. They also observed that the communication between teacher-student and teacher-parent was limited during the Covid-19 pandemic.

The examination of the participants' views on distance education and face-to-face in terms of gender showed a significant difference in favor of female participants. In line with this finding, Doğan (2020) found that female university students had a significantly more positive view of distance education than male university students. In addition, Sentürk, Duran, and Yılmaz (2020) determined that there was a significant difference in favor of female participants in communication sub-scale of students' views on distance education. On the other hand, Kaynar, Kurnaz, Doğrukök, and Şentürk-Barışık (2020) did not find a significant difference in distance education among elementary school students in terms of gender. Besides, Er-Türküresin (2020) concluded that male students were more positive in distance education.

The analysis of the participants' views on distance education and face-to-face education in terms of grade level showed that 5th grade students had significantly lower values than 6th, 7th, and 8th grade students, similarly, 6th grade students had significantly lower values compared to 7th and 8th grade students, and 7th grade students had significantly lower values than 8th grade students. Consistent with this finding, Doğrukök, Kurnaz, Şentürk-Barışık, and Kaynar (2021) found that 12th grade students had more positive perceptions about distance education compared to students in lower grades. In addition, Şentürk, Duran, and Yılmaz (2020) found that although there was no significant difference in functionality and motivation sub-scales with regard to grade level, a significant difference was found in communication sub-scale between 5th, 6th and 8th grade students in favor of 6th and 8th graders. This finding showed that the students in upper grades had more positive views on distance education. They argued that the reason for this finding may be that upper grade students need to prepare for the transition exam and that course contents may be prepared differently for grade levels. On the other hand, Kaynar, Kurnaz, Doğrukök, and Şentürk-Barışık (2020) concluded that there were

not any significant differences in elementary school students' distance education scores in terms of grade level. Finally, Akpolat (2021) proposed that in that as students' grade level increased, their negative perceptions towards distance education also increased.

The examination of participants' views on distance education and face-to-face education in terms of the average monthly family income revealed that the participants with 0-3000 income had significantly lower values than those with 3001-5000, 5001-7000 and 7001 and above. Similarly, it was found that the participants with 3001-5000 income had significantly lower values than those with 5001-7000 and 7001 and above. The reason for this finding may be related to the tools and internet access required in distance education. Özdoğan and Berkant (2020) listed the disadvantages of distance education as follows: lack of internet and computer, lack of measurement and evaluation, motivation loss, inequality of opportunity, lack of interaction, technical problems, lack of socialization and being unprepared. In Kabapınar, Kanyılmaz, Ören-Koçhan, and Atik (2021), the parents expressed that the students had difficulty in attending classes due to reasons such as the internet access, lack of technological infrastructure/hardware and the number of siblings. Similarly, Bozkurt and Duran (2021) concluded that the parents had problems in buying tools such as tablets and computers and internet access due to financial problems during the distance education process, and that those who had the internet access had problems connecting to EBA, as well as audio and communication issues.

On the basis of the findings of this study, it was concluded that middle school students' views on distance education and face-to-face education differ significantly by their mother and father's education level, gender, grade level and monthly average family income. It was found that the participants developed more positive perceptions towards distance education with the increase in education level of their parents. It was also found that female participants had significantly higher values compared to male participants. In addition, it was determined that participants' attitudes increased as their grade level increased. Finally, it was revealed that the attitude of

participants with a monthly average family income of 0-3000 was significantly lower than all other participants, and that those with a family monthly income of 3001-5000 had significantly lower values compared those with a family monthly income of 5001-7000 and above 7001.

### Recommendations

On the basis of the findings of the present study, the following suggestions can be put forward:

- More projects for teachers and parents should be planned in order to guide students on distance education, and as many stakeholders as possible should be informed about these projects.
- In order to eliminate the problems experienced in distance education, online trainings should be given to increase the digital literacy skills of the parents
- Studies should be carried out to increase communication between teachers and parents.
- Projects should be carried out to eliminate such problems as lack of tools, equipment and internet required for students to participate in distance education.

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