



Students Perspectives in Mathematics*

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Abstract: Mathematics is one of the important tools we use in solving the problems in our daily lives as much as we use in science (Baykul, 2000). There is no doubt that teachers play a significant role in mathematics teaching. Taking into account the importance of mathematics and mathematics education, the opinions of secondary school students on mathematics teachers and their attitudes in mathematics classes form the basis of this study. The aim of this research is to determine the relationship between secondary school students and mathematics teachers by examining the attitudes of secondary school students in mathematics lessons and their opinions about mathematics teachers. The study was carried out with a total of 60 students, 30 girls and 30 boys in Grade 7 and Grade 8 in a secondary school in Bafra District of Samsun Province during the first semester of the 2017-2018 academic year. This study is based on the case study, one of the quantitative research methods. During the study conducted for 8 weeks, "Teacher Evaluation Survey" published by MoNE (Ministry of National Education) and "Mathematical Attitude Scale" developed by Baykul (2006) was applied to the students. The obtained data were analyzed by IBM SPSS 15.0 package program. As a result of the analyses, it was determined that there was no significant difference regarding the opinions of students towards their teachers and the attitudes of students in mathematics in terms of gender and class variables. Moreover, it was found that there was no relation between the attitudes towards mathematics and the opinions about the teacher. Students expressed positive opinions about their teachers such as teachers are allowing different ideas, encouraging learning, providing effective mathematics teaching and establishing good communication.

Keywords: Attitude towards mathematics, teaching mathematics.

INTRODUCTION

The most important aim of teaching mathematics should be to make students understand the problems they may face in daily life and solve them in the shortest way (Baykul, 1997). Abstract concepts and principles making up the structure of mathematics are of great importance.

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Understanding these concepts and principles by students can only be realized through real experiences (Mathews, 1984). Students' attitudes towards mathematics are formed in the face of concrete experiences. This attitude will affect students' future experiences either positively or negatively.

Attitude is the tendency attributed to the individual that constitutes an individual's thoughts, feelings and behaviors about a psychological object in an orderly manner (Smith, 1968). Educators argue that individuals are indifferent in terms of the objects to which they show a negative attitude. Individuals state that the occupations to which they show a negative attitude are not suitable for them (Baykul, 2000). If we are to express this situation in terms of a mathematics lesson, the negative attitudes created by previous experiences will lead students to indifference and hence the failure. Students with a positive attitude will be more interested in mathematics and will make an effort to be successful.

According to Cüceloğlu (1991), there are two basic features on the basis of the attitude. The first of these; the attitude is long-term, that is, the mentioned tendency of the individual is observed for a long time. Accordingly, instantaneous and temporary tendencies are not seen as attitudes. In addition, it can be noted that attitudes are emotions that do not come with birth and are acquired later. The second characteristic is that the attitude is not just about feelings and thoughts, but also includes behaviors. It is expected that the individual will exhibit activities and behaviors that includes his or her feelings and beliefs towards something. We can give the continuous participation of a student, who loves mathematics, in the courses related to mathematics as an example.

Attitude is a concept that should be considered by all teachers. Attitude is much more important especially in mathematics lessons that are regarded as nightmares by students. Due to the previous experiences, a positive or negative attitude towards the mathematics lesson has occurred in secondary school students. The teacher cannot reach a successful result by ignoring students' positive or negative attitudes being acquired from their previous experiences. Life and experiences come to the fore in the formation of attitudes towards mathematics. In addition, teachers' attitudes towards mathematics affect the attitudes of students as well.

In the learning environment, positive or negative attitudes are formed by the students against the topic taught. It is known that positive attitudes lead to greater academic success, on the contrary, negative attitudes lead to a decrease in academic achievement (Tuncer, Berkant & Doğan, 2015). In an educational system where academic success is prioritized, the importance of having a positive attitude is of great importance.

Attitudes developed in a negative way towards mathematics are transformed into behaviors by being affected by some other reasons at the next stage and become obstacles in achieving success in mathematics education. Furthermore, it is possible to come across studies on fear, anxiety and negative attitudes towards mathematics (Baloğlu, 2001). In order to remove negative attitudes, different methods such as using visual elements in educational environments, providing information, supporting the information, attracting attention and direct attention, summarizing the topics, showing the relations between the cases or concepts, making complex issues that are difficult to visualize in the mind easier to comprehend can be used. Certainly, teachers have a major role in the formation or change of attitudes. Particularly, the attitudes of the 5th-grade students of secondary school towards the mathematics lesson should definitely be taken into consideration. Their trust in teachers should be increased by creating an atmosphere that will make them feel successful.

Mathematics should not be seen as a course only formed of numbers, rules, and forms coming together. Mathematics has its own particular order and a group of relationships in this order.

If the students have not absorbed this order and relationships, they will not have learned mathematics. In fact, mathematics is a different world where students discover and to which they attribute a meaning in their own minds. In this world, the more comfortable and unique the student is, the more successful they will be.

Another important factor for the success of a student in mathematics is the teacher. The main objective of education is to make an individual a harmonious member of the society in which he or she lives and the contemporary world that the society is bound to (Çelikten, Sanal and Yeni, 2005). The ability of students to adapt in a society is closely related to the process of solving the problems they encounter. Whether we are aware or not, we use mathematics in various areas in our daily lives. Although a lesson that is used in everyday life should be loved and well known by all students, it can be said that the mathematics course is one of the most frustrating courses for the students in our country (Yılmaz, 1995). In this case, the priority of mathematics teachers should be to remove the negative attitudes and fears students have.

It is a fact that secondary school students are much influenced by the environment they are in due to their age groups. They can get into different shapes by paying attention to the characters in a television series or sometimes by having interest in the heroes in a game they play. A student who spends about 8-9 hours a day at school can affect almost all students. It is not possible for teachers to remain indifferent in such situations. He or she can enter the minds of students by using a line from a TV series or saying a hero's name of a game. This situation will change the perspective of the students towards their teacher. In order to teach mathematics, it is not enough just to enter the classes but also necessary to access their minds.

Since mathematics is a way of thinking, the aim of mathematics teaching is not only to provide knowledge to the student; it should also contribute to the mental development of the student. Hence, the content and methods of mathematics education need to be regulated in such a way to improve the high-level skills of individuals and contribute to these skills (Pesen, 2003). Moreover, classroom management strategies used by the teachers and the level of relationship between students are among the factors of attitude against the course.

There are a number of factors that affect the success of students at school. Achievement motivation, anxiety, qualifications of the family, socio-economic characteristics, inadequate school and education conditions, general environmental characteristics, nutrition and healthcare conditions are among the main factors. Sometimes, some of these variables affect student achievement positively, whereas in some cases they can affect it negatively.

According to Bruner (1996), teachers should encourage their students to discover the principles on their own accord according to their interest. For this purpose, teachers and students should have an active dialogue. The duty of the teachers is to perform teaching according to the final state of the understanding level of the students and to transform the knowledge into a state that the student can easily access. The education program should be organized in a spiral way so that students can constantly add to their previous learning (Ocak, 2005). Teachers should organize the teaching and learning environment in such a way that it enables students to reach knowledge on the shortest path and to understand the knowledge on their own. Information can only be configured by an individual in a type of environment mentioned here (Cüce, 2012). Individuals, who have obtained the knowledge, will enjoy this process and they will form their next learning in this regard. One of the main aims of teachers should be to educate individuals who generate knowledge rather than memorizing it.

In order to be able to develop a positive attitude towards mathematics in students, the teacher should be influential on the student. The influential teacher is the person who has the ability to develop the intended learning objectives (Perrott,1982). In order to be able to make effective teaching, firstly it is necessary to set the objective. The success of a student is a coincidence unless there is a determined aim. Determination of an aim is the priority for an effective teaching, but it is not solely enough. The relationship between a teacher and a student is also very significant in terms of effective teaching.

Rapid developments in science and technology in recent years have also deeply influenced the aims of mathematics education. In these days, the fact that individuals can use mathematical rules and formulas excellently and that they have fast arithmetic processing skills in the field of mathematics is no longer regarded sufficient. In addition, individuals are expected to be able to think mathematically, express mathematically, value mathematics, and have good problem-solving skills. In order to realize these aims, firstly it is necessary that contemporary learning and teaching approaches are adopted and that the teacher's view of "teaching mathematics" and the student's view of "learning mathematics" change. Therefore, it is essential that the teachers should form the environment enabling them to build their own mathematical knowledge rather than presenting the mathematical knowledge to the students.

The Problem Statement

The problem statement of the study is how students determine their opinions regarding mathematics teachers and how this affects their attitudes towards mathematics. Moreover, what a mathematics teacher should pay attention to during the course in the eyes of students is another concern of the problem.

Research Questions

In order to broaden the scope of the study and to clarify the problem of the study and to examine it in detail, the problem of the study is divided into the following research questions:

- 1) Do teacher evaluation scores of secondary school students create a significant difference according to gender and class variables?
- 2) Do the attitude scale scores of secondary school students towards mathematics create a significant difference according to gender and class variables?
- 3) What is the relationship between the scores obtained from the teacher evaluation survey and mathematics attitude scale scores?

METHOD

Research Model

The study has been designed in the relational survey model included in the quantitative research paradigm. The relational survey is a method used for the description of a past or existing situation, estimation of the presence of the relationship between these variables and its dimension or predicting another variable with the help of some variables (Karasar, 1994; Mertens, 1998). Based on this model, the students' attitudes towards mathematics teachers and their attitudes towards mathematics have been examined in terms of gender and class variables. In addition, the relationship

levels between the scores obtained from the teacher evaluation survey and the scores obtained from the mathematics attitude scale have been analyzed with the help of statistical procedures.

Sample

Characteristics of the sample

The sample consists of the students in 7/A and 8/F classes in a secondary school in Bafra District during the 2017-2018 academic year. The distribution of participants by gender and class levels was given in Table 1. A total of 60 students were included in the study. 30 of them were girls (50%) and 30 of them were boys (50%). 30 of the participants were studying in the 7th grade and (50%) 30 were in the 8th grade (50%).

Table 1: Demographic Characteristics of Participants

	Frequency (<i>f</i>)	Percentage (%)
Gender		
Girl	30	50
Boy	30	50
Class Level		
7/A	30	50
8/F	30	50

Data Collection

The genders of the students were taken into consideration in the selection of the participants for the study. Classes with an equal number of boys and girls were selected for the study. In addition, the fact that the total population in each class should be equal was considered. The success averages of the classes were not taken into account.

Teacher Evaluation Survey

In order to determine students' thoughts on mathematics teachers, "Teacher Evaluation Survey" published by MoNE (2006) was used. The survey consists of 17 Likert type items. The answers to these items are: "I do not agree (1), I am neutral (2) and I agree (3)". The highest score that can be obtained from this survey is 51 and the lowest score is 17. The increase in the score indicates that the students have a positive opinion about the teacher. Exploratory factor analysis was made for this survey and the total variance explained in the scale was determined to be 50.4%. It was observed that it was the only factor with an Eigenvalue higher than one in exploratory factor analysis. The reliability coefficient (Cronbach Alpha) in this study was calculated as 79.

Attitude Scale for Mathematics

In order to determine the students' attitudes towards mathematics "Mathematics Attitude Scale", developed by Baykul (2006) was used. The survey consists of 30 items Likert type items. The answers of these items were determined as "I definitely do not agree (1), I do not agree (2), I generally agree (3), and I totally agree (4)". The highest score that can be obtained from the scale is 120, the lowest score is 30. The increase in the score indicates that the positive attitude towards mathematics has increased. Exploratory factor analysis of this scale was made, and it was observed that it was the only factor with an Eigenvalue higher than 1 in exploratory factor analysis. In addition, the Cronbach Alpha reliability coefficient was calculated as 0.82.

Data Analysis

The data were transferred into the computer environment and analyzed using the IBM SPSS 15.0 package program. First, the data were controlled for the errors that could occur during entering them on the keyboard. The arithmetic average value was calculated for students' general attitudes towards mathematics and thoughts about their mathematics teachers through the IBM SPSS 15.0 package program. By analyzing the normality of the data, Mann-Whitney U test was applied according to gender and class variable about whether there is a significant difference between students' attitudes towards mathematics and opinions about their teachers' opinions. The level of significance was taken as $p < 0.05$ and the results obtained were interpreted in this context.

FINDINGS

Findings regarding the first research question

The first finding of the study was for determining whether the scores of the secondary school students received from the teacher evaluation survey varied according to the gender and class. Firstly, it was examined whether the data obtained for this research question showed normal distribution.

Table 2: The normality test results of the data obtained from the teacher evaluation survey

	Kolmogorov-Smirnov		
	Statistics	Sd	p
Teacher Evaluation Survey	.158	60	.01*
Attitude Scale	.122	60	.028

* $p < 0.05$

When Table 2 was examined, it was observed that the data obtained from the teacher evaluation survey were not normally distributed ($p = .01 < .05$). As a result of this situation, Mann-Whitney U test from nonparametric tests was applied. Additionally, arithmetic averages were also calculated according to gender and class variables.

Table 3: Mann-Whitney U test results for class and gender variables of the data obtained from the teacher evaluation questionnaire

Variable	Average (\bar{x})	Mann-Whitney U (p)
Gender		
Girl	49.18	0.73
Boy	48.69	0.73
Class Level		
7/A	49.70	0.22
8/F	48.55	0.22

According to Table-3, the arithmetic average of female students participating in the study was found to be 49.18 and the arithmetic average of male students was 48.69. The Mann-Whitney U test result was obtained as 0.73. Since the result obtained was greater than the significance value of 0.05, it was found that there was no significant difference between the scores obtained from the teacher evaluation survey and the gender variable. Also, the arithmetic average of 7th-grade students participating in the study was found as 49.7 and the arithmetic average of 8th-grade students was 48.55. The applied Mann-Whitney U test result was found to be as 0.22. Since the result obtained was greater than the significance value of 0.05, it was found that there was no

significant difference between the scores obtained from the teacher evaluation survey and the grade variable.

Findings regarding the second research question

The second research problem of the study is to determine whether the scores obtained from the mathematics attitude scale of students vary according to the grades and genders. It was examined whether the data obtained for this research question showed normal distribution.

Table 4: Normality test of the data obtained from attitude scale towards mathematics

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	Sd	p	Statistics	Sd	p
Teacher Evaluation Survey	.158	60	.01	.909	60	.01*
Attitude Scale	.122	60	.028	.952	60	.018

*p<0.05.

When Table 4 was reviewed, it was also seen that attitude scale data were not distributed normally ($p = .028 < .05$). As a result of this situation, Mann-Whitney U test from nonparametric tests was applied.

Table 5: Mann-Whitney U test results for the class and gender variables of the data obtained from attitude scale towards mathematics

Gender	Average (\bar{x})	Mann-Whitney U (p)
Girl	74.56	0.31
Boy	74.8	0.31
Class Level		
7/A	74.53	0.18
8/F	74.83	0.18

According to Table 5, the arithmetic average of female students participating in the study was found as 74.56 and the arithmetic average of male students was 74.8. The Mann-Whitney U test result was obtained as 0.31. Since the result obtained was greater than the significance value of 0.05, it was found that there was no significant difference between the scores obtained from the mathematics attitude scale and the gender variable. Also, the arithmetic average of 7th-grade students participating in the study was found as 74.53 and the arithmetic average of 8th-grade students was 74.83. The applied Mann-Whitney U test result was found to be as 0.18. Since the result obtained was greater than the significance value of 0.05, it was found that there was no significant difference between the scores obtained from the mathematics attitude scale and the grade variable.

Findings regarding the third research question

For the third research question of the study, it was tried to examine the relationship between the teacher evaluation survey and the data obtained from mathematics attitude scale. Correlation analysis was performed in line with this research question. The obtained results were shown in Table-6.

Table 6: Correlations between the data obtained from the scale of attitude towards mathematics and the data obtained from the teacher evaluation questionnaire

Measurements	n	r	p
Teacher Evaluation Survey	60	.20	.01
Attitude Scale	60	.20	.01

The Spearman coefficient was obtained as 0.20 ($r = .20$; $p = .01$). As a result, it was determined that the scores obtained from mathematics attitude scale and the teacher evaluation survey were related in a positive way but at a poor level.

DISCUSSION AND CONCLUSION

According to the findings obtained in the study, it has been found out that students have developed a positive attitude towards mathematics teachers in general. It can also be said that female students have more positive opinions compared to male students. Moreover, the students in class 7 / A have more positive views than the students in class 8 / F. It is possible to show the different subjects or test anxiety experienced in the 8th grade as the reason for this situation. According to the data, it can also be highlighted that the teacher does not perform any different behaviors in the classes and between boys and girls. Another reason for the high score average may be that students have responded with grade anxiety.

On the other hand, it was seen that the number of students who made positive comments was high. However, criticism has also been written about the use of technology. One of the important factors turning mathematics into a nightmare in the eyes of students is that it is abstract. At this point, technology helps the teacher. MoNE is trying to promote education and information network in schools. Secondary school students are using all the opportunities of the age they are in. They even outdistanced their parents and teachers in this regard. In particular, teachers need to pay a little more attention to this issue. Computers and tablets should be actively used in materializing mathematics. The studies conducted also support technology-supported mathematics learning is more permanent.

When the average scores of the mathematics attitudes scale of the students are taken into consideration, male students have more positive attitudes than female students. When evaluated on a class basis, the students in the class 8/F have more positive attitudes than the students in the class 7/A. In a general sense, it can be said that all the students who participated in the study have a positive attitude towards mathematics. However, there was no significant difference was found between the scores obtained as a result of the scale and gender and class variables. These results are consistent with the mathematics general performances and levels of interest of students in the age group of 15 in the results of the OECD-PISA project, conducted by the Ministry of National Education regarding the national research about Turkey. Also, the fact that mathematics is one of the main courses and plays a decisive role in most exams makes the approach of students similar without gender discrimination.

The fact that there is a positive relationship between the teacher evaluation survey and mathematics attitude scale scores is similar to other studies in the literature. However, the fact that this relationship is weak is an unexpected result. The relationship is stronger in the vast majority of other studies in the literature. The fact that the number of students is limited to 60 is one of the reasons for this situation. Moreover, grade anxiety is another reason for this situation although it was told to the students that the study to be performed would not be graded. The study can be

repeated by reaching more students and the results can be compared. The studies performed in the same way as the study we have conducted below were also available.

According to Tuncer, Berkant & Yılmaz (2015), they worked with 225 secondary school students in a study called an evaluation of the opinions of secondary school students regarding their attitudes and concerns towards mathematics lesson. As a result of the survey conducted according to the survey model, there was no significant difference found between attitude and anxiety towards the attitude and anxiety belonging mathematics course in terms of gender. In the study, there was a significant difference determined between 6th and 7th, 7th and 8th and 6th and 8th-grade students in terms of classroom variable between both attitude and anxiety scores. In another study, Yücel and Koç (2011) found that the primary school second-grade students showed a positive attitude at a good level about mathematics course and that the achievements in mathematics were moderate. Furthermore, when gender differences were examined, it was found that there was no difference between male and female students in mathematics attitude and achievement. And, Avcı, Coşkuntuncel and İnandı (2011) conducted their study titled, attitudes of the twelfth-grade students in secondary education towards mathematics, with 835 grade students. While there was no significant difference found between students' attitudes toward mathematics and gender, a significant difference between the type of school they study and the mathematics attitude and between the type of field they study, and their mathematics attitudes have been seen. Akdemir (2006) worked with 715 students in his thesis titled as the attitudes towards mathematics and success motivation of the primary school students. As a result of the study, it was determined that the attitudes of elementary school students towards mathematics showed significant differences, however, they did not show significant differences according to gender in terms of the socio-economic situation of the school, education status of the parents and school type. These results support this study.

Students' previous experiences and environments also play an important role in the formation of their attitudes towards mathematics. The presence of people with negative attitudes, especially in family and friendship, will affect students in a negative way. In this case, the teacher has essential duties. First, such students should be identified and encouraged. Anxiety and fear can be reduced with questions appropriate to their level. While explaining mathematics lessons, direct instruction method should be abandoned, and the course should be taught using active learning methods. It should not be forgotten that each student has his or her own way of perception and level of understanding.

Teachers should be willing, energetic and compassionate in the classroom. They should pay attention to gestures and mimics and the language they use. They should shape the lessons according to the interests and needs of the students and give them tasks in which they will be successful (Baykul, 2004). In addition, the teacher should make eye contact during the course without disturbing the students and address them with their names. When the data obtained from the students in the study we have conducted are examined, comments such as "Our teacher is interested in our problems and values us. That is why I like him or her" are observed. In order to establish a good communication with students, first, it is necessary to listen to them. In order to develop a positive attitude towards the lesson, first students should like the teacher and trust him or her.

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