



## EXPERIENCED TEACHERS' METHODS AND TECHNIQUES USED FOR THE STUDENTS WHO DISLIKE MATHEMATICS

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### Abstract

There is a general opinion in our country and in the world that the course of mathematics is difficult. Many students mention that they do not like mathematics due to their perception of being unsuccessful and the difficulty of mathematics since young ages. The purpose of this study is to identify how mathematics teachers, especially experienced ones, behave to those students having a negative attitude towards mathematics due to various reasons, which kind of methods and techniques they use and whether they do specific activities for the students. 17 mathematics teachers having 10 years or more of experience in the teaching job participated in the study voluntarily. The results showed that it is very difficult to take students' attention to the course of mathematics as they do not like it. Teachers usually try to make students feel successful with the practices to be solved easily.

**Keywords:** Students who dislike mathematics, experienced teachers, methods and techniques

### INTRODUCTION

Mathematics can be defined as an amusing field for the children with simple addition-subtraction activities that start with counting at young ages. However, it is seen that mathematics is defined as a difficult and boring course along with the beginning of the educational life of the individual. The negative thoughts that start in the primary school period and increase in the progressive school years bring along the decrease in interest in the course of mathematics, as well (Peker and Mirasyedioğlu, 2003). The reasons for negative attitudes towards mathematics have been investigated by many researchers. In their study, Dursun and Dede (2004: 223) collected these reasons under 10 headings: gender, parents' educational level, socioeconomic level, teacher competencies, teaching strategies and techniques applied, physical facilities of the school, curriculum, hard and disciplined working, listening to course well and mathematical intelligence. When mathematics teachers' opinions on the factors that affect students' success are examined, it can be said that listening to course well, teacher competencies and the teaching strategies and techniques applied during the course are among the most effective factors (Dursun and Dede, 2004). The importance of teachers' opinions becomes evident when the result that these factors significantly affect the attitudes towards mathematics course is taken into consideration.

In the present day when information is rapidly increasing and changing, the question of how mathematics course can be liked by children, in other words, how to create positive attitudes towards the course for the students who dislike mathematics is at the top of the agenda as an important question of debate. To investigate whether the teachers as the answerer to this question, especially those experienced in their profession use certain methods or techniques for the student group defined as the "students who dislike mathematics" constitutes the basis of this study. Based on this idea, the research question was determined as "Which methods and techniques are used by experienced mathematics teachers for secondary school students who dislike mathematics?". Besides, the change

of the techniques used by teachers according to students' gender and age groups (grade levels) was also discussed. In addition, whether the techniques used by teachers are based on any theoretical approach was also investigated.

## METHOD

The phenomenology design was used in this study in which the events and thoughts were examined and revealed in a natural environment in a realistic and holistic manner (Yıldırım and Şimşek, 2005). Various situations such as experiences, perceptions, orientations and concepts about life are called the facts. The phenomenology design focuses on the facts which are recognized but do not have the in-depth and detailed understanding (Yıldırım and Şimşek, 2005). Individual experiences constitute the basis of phenomenology, and the personal (subjective) experiences, perceptions of the participants involved in the study and the meanings attributed by them to the events are examined (Baş and Akturan, 2008). To determine what the methods and techniques used by experienced mathematics teachers for secondary school students who state that they dislike mathematics are constitutes the focus of the study. In this study carried out with experienced mathematics teachers, the one-on-one interview technique among the qualitative data collection methods was used.

### Study Group

17 teachers working in schools affiliated to Ministry of National Education in Ankara province in the spring term of the 2015-2016 academic year participated in the study voluntarily. The participants working as mathematics teachers for 10 years or more were invited to the study by giving information about the purpose of the study as the professional experience was the criterion in this study. Participants consisted of teachers working in three different secondary schools located in Keçiören district in Ankara, where the second author of this study resides, who worked as mathematics teachers in a private educational institution. The teachers with 10 years or more teaching experience were included by the criterion sampling method among the purposeful sampling methods, thus it was aimed to reach rich and in-depth knowledge in line with the purpose of the study (Yıldırım and Şimşek, 2005). 15 of the teachers work in different state secondary schools, and 2 of them work in a private study center. The numbers of participants according to the demographic information are indicated in the following tables. As it is seen in Table 1, 13 of the participating teachers were female, 4 of them were male. As it is indicated in Table 2, 9 teachers from the 25-35 age group, 4 teachers from the 36-45 age group, 2 teachers from the 46-55 age group and 2 teachers from the 56 years and over participated in the study. When Table 3 is examined, it is seen that there are 11 teachers with 10-14 years teaching experience, 1 teacher with 15-19 years experience, 1 teacher with 20-24 years experience, 2 teachers with 25-29 years experience and 2 teachers with 30 years and more experience.

Table 1: Number of Participants by Gender

Gender		Total
Female	Male	
13	4	17

Table 2: Number of Participants by the Age Range

Age Ranges	25-35	36-45	46-55	56 and over	Total
Number of people	9	4	2	2	17

Table 3: Number of Participants by Teaching Experience

Teaching Experience (year)					Total
10 -14	15-19	20 -24	25-29	30 and over	
11	1	1	2	2	17

### **Data Collection Tool and Data Analysis**

The semi-structured interview form was used in obtaining the data. The questions in the form were prepared by the second author, who is a teacher, of this study and were edited by the first author and an academic member of the educational sciences department by receiving expert opinions. The interviews conducted with teachers were recorded on condition of receiving their permission. Interviews lasted for 20-30 minutes on average. The interviews were conducted face-to-face in an environment determined by the teacher (teachers' room, interview room, principal's office, etc.). The answers of two teachers who did not want to allow voice recording were taken as written. The recorded interviews were transcribed verbatim by the second author. The descriptive analysis was performed in the analysis of the data. The data were coded separately by both researchers and the categories were revealed. The descriptive analysis was preferred as the data were summarized and interpreted by predetermined categories, and the interviewed individuals used direct quotations to reflect their opinions in a striking way (Yıldırım and Şimşek, 2005). The codes of T1, T2, ...T17 were used while indicating the findings and direct quotations of teachers.

8 basic questions about the methods and techniques used by experienced mathematics teachers for the students who dislike mathematics were included in the semi-structured interview form, but 5 questions were included within the scope of this study. Further questions were also asked depending on the teachers' answers. The questions in the interview form are listed below:

- 1) What are the situations that arise as a result of the fact that secondary school students do not like the course of mathematics?
  - a. Can you talk about their individual situations in more detail?
  - b. Can you talk about the results reflected in the classroom environment?
  - c. Can you give examples that support these situations?
- 2) Do you use any method or technique to remove these situations (to maintain the desired behavior)? (if any) What are they?
  - a. Do you think you need additional information and activities to make these methods and techniques you use more effective?
  - b. How do you conduct such activities?
- 3) What do you think about whether gender difference has an effect on the methods and techniques you use?
  - a. If any, what kind of differences do you make in your methods and techniques?
- 4) Do the age groups (class levels) have effects on the implementation of the methods and techniques you use?
  - a. If any, what kind of differences do you make in your methods and techniques?
- 5) Do you base the methods and techniques you use on any theoretical basis (approach)? Why

### **FINDINGS**

The findings related to the interviews held with the teachers who participated in the study are presented by being arranged in tables for each question. These tables include the codes and categories determined (if any, subcategories), teachers' codes and frequency information.

Table 4: Question 1. What are the situations that arise as a result of the fact that secondary school students do not like the course of mathematics?

Categories	Codes	Teachers' Codes	f
Behaviors of the student who dislikes the course	▪ Distracting their friends	T1,T5,T6,T7,T9,T10,T11,T16	8
	▪ Losing concentration on the course because of not understanding the course	T1,T5,T7,T8,T12	5
	▪ Being engaged in some other things	T1,T7,T10,T13	4
	▪ Indifference towards the course	T2,T8,T10,T13	3
	▪ Not listening to the course	T1,T7,T17	2
	▪ Daydreaming	T1,T3	2
	▪ Failure	T7,T8	2
	▪ Attempt to disturb the course order	T3,T9	2
	▪ The fact that the sense of failure is disturbing	T2	1
	▪ Trivializing mathematics	T6	1
Results reflected in the classroom environment	▪ Teacher's unrest/decline in motivation	T2,T6,T7,T10	4
	▪ Discomfort in students who listen to the course	T1,T9,T13	3
	▪ Unrest in the classroom environment	T1,T2,T13	3
	▪ Difficulty in the classroom management	T6	1
	▪ Teacher's self-questioning	T6	1
Reason for the negative attitudes towards mathematics	▪ Decrease in the course efficiency	T9	1
	▪ Prejudice in students	T2,T7,T8,T14	4
	▪ Primary school teachers	T5	1
	▪ Dislike of the teacher	T7	1
	▪ Coming to the course without making preparations	T10	1
▪ Imperfect knowledge originated from the primary school	T17	1	

As it is seen in Table 4, the situations that arise as a result of the fact that students do not like the course of mathematics are collected in three different categories. The first of these was determined as the behaviors of the student who dislikes the course. It is seen that the most frequently mentioned student behaviors are distracting their friends, losing concentration on the course because of not understanding the course, being engaged in some other things, indifference towards the course and not listening to the course. The second category was determined as the results reflected in the classroom environment. The results such as unrest in the classroom environment, difficulty in the classroom management, teacher's self-questioning and a decrease in the course efficiency emerged. The third category was indicated as the reasons for the negative attitudes towards mathematics. Although a question about the reasons for the negative attitudes of students was posed to teachers who participated in the study, 8 of 17 teachers mentioned the related reasons. It is seen that prejudice against mathematics was the most mentioned reason. Primary school teachers, dislike of the teacher, coming to the course without making preparations and imperfect knowledge originating from the primary school are also considered to be among these reasons.

Table 5: Question 2. Do You Use Any Method Or Technique To Remove These Situations?

Categories	Sub-Categories	Codes	Teachers' Codes	f
Methods and techniques used by the teacher	Student-centered	▪ To make students feel the sense of success with easy-to-solve questions	T7, T9, T13, T14, T17	5
		▪ Use of positive reinforces		5
		▪ To make the course enjoyable	T3, T4, T7, T16, T17	5
		▪ To give worksheets/smiley face stickers	T2, T4, T6, T7, T8	4
		▪ Endearing himself/herself	T2, T3, T5, T16	4
		▪ To call students to the blackboard	T3, T7, T11, T17	3
		▪ To solve the problem together by sitting next to the student	T6, T8, T13	2
	Teacher-centered	▪ To have material prepared	T8, T17	2
		▪ Attempt to endear mathematics	T6, T13	1
		▪ Advice to students	T7	1
		▪ To leave indifferent students alone	T4, T15	2
		▪ To emphasize the importance of mathematics	T9, T12	2
		▪ To speak of the meeting with parents	T4, T15	2
		▪ To be authoritative	T1	1
	▪ To ensure being prepared for the course	T8	1	
	▪ To make repeat the things told by himself/herself	T10	1	
		T4	1	

As it is seen in Table 5, the methods and techniques used by the teacher are collected in two separate subcategories as student-centered and teacher-centered. When student-centered techniques are examined, it is seen that the fact that the teacher makes students feel the sense of success with easy-to-solve questions, attempts to increase students' interest in the course with positive reinforces, and to make the course enjoyable are most commonly used techniques. To give worksheets or smiley face stickers, teacher's attempt to endear himself/herself, and attempt to increase the interest in the course by calling students to the blackboard are among the techniques expressed by teachers. When teacher-centered techniques are examined, it is seen that methods and techniques such as advice to students, leaving indifferent students alone, speaking of the meeting with parents, being authoritative, ensuring being prepared for the course, emphasizing the importance of mathematics, and making repeat the things told by himself/herself were used.

In the 2<sup>nd</sup> question, an additional question about whether teachers need additional information and activities to make the methods and techniques they use more effective was also posed. Teachers' statements are seen in Table 6. It is emphasized that the most commonly mentioned requirements are to be closely acquainted with the students on an individual basis and to keep in touch with the parents. These are followed by the requirement of spending more time with the students in the 5<sup>th</sup> and 6<sup>th</sup> grades. In addition to these, requirements such as conducting one-on-one interviews with the students, conducting more activities in classrooms where there are students who like mathematics, the necessity of applying different motivation techniques to different students, teacher's self-improvement from professional aspect and giving students the opportunity to make decisions were also expressed.

Table 6: Question 2a. Do You Think You Need Additional Information and Activities To Make These Methods And Techniques You Use More Effective?

Category	Codes	Teachers' Codes	f
The need for additional information and activities to make the techniques used more effective	▪ To be closely acquainted with the students on an individual basis	T10,T12, T13,T16, T17	5
	▪ To keep in touch with the parents	T10,T11,T13	3
	▪ Teacher spends more time with the student in the 5 <sup>th</sup> and 6 <sup>th</sup> grades	T1, T14	2
	▪ Conducting one-on-one interviews	T1	1
	▪ To conduct more activities in classrooms where there are students who like mathematics	T2	1
	▪ The necessity of applying different motivation techniques to different students	T3	1
	▪ Teacher's self-improvement from professional aspect	T16	1
	▪ To give students the opportunity to make decisions	T6	1

The following table includes the examples of direct quotations related to question 2 obtained from the interviews performed with participating teachers.

Table 7: Examples of Direct Quotations Related to Question 2

Categories	Examples of Direct Quotations
Techniques used by the teacher	<ul style="list-style-type: none"> <li>▪ <i>I use stamps like the stamp of well done for the motivation of children. I use the stamp of well done for very difficult questions. Then, we count the number of stamps and give a verbal note or something. Of course, I do not know how much it works. (T5)</i></li> <li>▪ <i>For example, we prepared the street of mathematics. Of course, it is very enjoyable to perform all these kinds of activities together with the students. Students are getting motivated. There is not a significant increase in terms of information but at least attendance to lesson increases depending on how much we can make the students involve in the game. At least they can say that I will do this triangle instead of attending the course and then leaving the classroom without being indifferent. (T6)</i></li> <li>▪ <i>Whoever brings homework earlier or does it in a more detailed way, whoever submits me the homework more properly, I give him a reward. Thus, I am trying to create a more competitive environment because students become more efficient in such environments. (T8)</i></li> <li>▪ <i>We are trying to make students ready for the course. I have a method called the three-study method applied by me for this. I explain to students how to study through a method on the fact that students should firstly repeat the subjects they have learned within the day and then perform 40 minutes of repetition, 40 minutes of doing homework and 40 minutes of preparation for the next course... If a student comes to the course well-prepared, he/she will attend the course and will enjoy the course he/she has attended, he/she will like the teacher and school, and I think everything will be more favorable. (T10)</i></li> </ul>

The need for additional information and activities to make the techniques used more effective	<ul style="list-style-type: none"> <li>▪ <i>I will call your parents to the school if you continue these behaviors. (T1)</i></li> <li>▪ <i>I often try to conduct individual interviews to spend a long time with children. I begin to get more efficient results when I see them as an individual and communicate individually. (T1)</i></li> <li>▪ <i>The common situation is to try to motivate them, but each student is motivated differently, this should be accepted. We have to watch them, observe them, spend some time with them to realize it. (T3)</i></li> <li>▪ <i>I do not have something that students do not want to do done or I tell the possible probabilities when students decide on something, they choose a possibility among them. Thus, they can be motivated by saying that at least this is our decision, we have decided. Students are very enthusiastic about making decisions ... I think they feel themselves within the event in this way. They're starrng. This is a better position for me and for the course, of course." (T6)</i></li> </ul>
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As it is seen in the following table (Table 8), the answers given to the question about the effect of gender difference in the methods and techniques that teachers use for students who do not like mathematics are collected in 3 different categories. The vast majority of the teachers (f=10) stated that there was no gender difference, and subsequently, they emphasized the differences between male and female students. The statements regarding the fact that female students are more successful, regular and eager to the course were the most frequently mentioned gender difference. A small number of the teachers stated that female students are more touchy, ambitious and active, and male students are more untidy, unwilling and outgoing. Statements such as treating female students more gently, the ease of communicating with female students and conducting motivating activities for male students are included in the category of differences reflected in teachers' behaviors. The codes such as intervening with male students loudly and the difficulty of communicating with male students are also included.

Table 8: Question 3. What Do You Think About Whether Gender Difference Has An Effect On The Methods And Techniques You Use?

Categories	Codes	Teachers' Codes	f
The lack of gender difference	▪ The lack of gender differences in the 5 <sup>th</sup> and 6 <sup>th</sup> grades	T2,T5,T6,T7,T8,T9,T10, T14,T16,T17	10
	▪ The fact that female students are more successful, regular, willing to course	T3, T6, T9	3
Gender difference	▪ The fact that female students are more touchy	T3, T10	2
	▪ The fact that female students are more active	T8, T9	2
	▪ The fact that female students are more ambitious	T5	1
	▪ The fact that male students are more untidy	T4, T13	2
	▪ The fact that male students are more energetic and outgoing	T1, T3	2
	▪ Male students' laziness	T6	1
	▪ Male students' unwillingness	T9	1
	▪ Treating female students more	T3, T10, T17	3

Differences reflected on teacher's behavior	gently		
	▪ The ease of communicating with female students	T1, T11	2
	▪ To conduct motivational activities for male students	T1, T6	2
	▪ To intervene with male students loudly	T1	1
	▪ The difficulty of communicating with male students	T12	1

The following table includes the examples of direct quotations related to question 3 obtained from the interviews performed with participating teachers.

Table 9: Examples of Direct Quotations Related to Question 3

Categories	Examples of Direct Quotations
The lack of gender difference	▪ <i>Because our students are children, maybe they would be different if they were in high school. I almost apply the same methods in the eighth grade or lower classes. There is no difference in gender. (T7)</i>
Gender difference	▪ <i>Female students are more active in participating in the course. That is to say, male students can be distracted quicker because their social life outside the school is wider, but the girls do not. (T8)</i>
Differences reflected on teacher's behavior	<ul style="list-style-type: none"> <li>▪ <i>I think gender difference has an effect on the methods we use. For instance, the difficult student of mine was male in this year. To communicate with a male student, I say it for a female teacher, can be a little difficult. For example, it is easier for me in terms of a female student. For example, you can give a hug, you can show love. In fact, there is a gender difference for me. I can more easily move forward in motivating female students. (T11)</i></li> <li>▪ <i>Female students realize that I feel bad. They then choose to leave unwanted behaviors in the short term. But I have difficulty communicating with male students so easily like this. Therefore, I think I shout at them more. (T1)</i></li> <li>▪ <i>I mainly try to prepare questions appeal to male students to appeal them to the course. For example, I am trying to use the examples related to sports or games. There is no need to do this sort of thing for female students as they are more impetuous. They are a little more aware of their responsibilities. Therefore, you may think that to attract male students is more important. Female students are more active in mathematics as they are in every subject. (T6)</i></li> </ul>

As it is seen in Table 10, the implementation of the methods and techniques that teachers use for students who dislike mathematics according to age groups (class level) is collected under two categories including its effect according to age groups (class level) and the differences reflected on teacher's behavior. In the first category, the importance of the effect of age groups (class levels) and the differences according to groups were mentioned. 5 teachers stated that age has a big influence. However, they stated that fifth graders are calm, eighth graders are energetic, 5<sup>th</sup> and 6<sup>th</sup>-grade students have difficulty in concretizing the abstract mathematical subjects, 7<sup>th</sup> and 8<sup>th</sup> graders are more outgoing but are lacking in respect for the teacher. In addition, one teacher emphasized that students are more inclined to refrain from the teacher and parents as the age groups decrease.

In the second category, when differences reflected on teacher behaviors are examined, it is seen that 4 teachers stated that students have different sources of motivation according to age groups. 3 different teacher groups mentioned that activities and narrative techniques vary by class levels. In addition, it was also stated that there is a difference in communication between lower and higher classes, the progress of the subjects in upper classes (7<sup>th</sup> and 8<sup>th</sup> grades) is faster, and problem solving is easier in lower classes compared to higher classes. In addition to these, the ease of

communication and education with upper classes, long-time activities in small age groups, showing love for lower classes and treating 8th graders in a more rigid style are the other differences stated.

Table 10: Question 4. Do The Age Groups (Grade Levels) Have Effects On The Implementation Of The Methods And Techniques You Use?

Categories	Codes	Teachers' Codes	f
Effect of age groups/grade level	▪ Significant effect of age	T2,T6,T7,T8,T13	5
	▪ 5 <sup>th</sup> and 6 <sup>th</sup> grade students have difficulty in concretization	T3,T17	2
	▪ 5 <sup>th</sup> graders are calm	T4	1
	▪ 8 <sup>th</sup> graders are very energetic	T4	1
	▪ Higher grades are outgoing	T4	1
	▪ 8 <sup>th</sup> graders are lacking in respect for the teacher	T4	1
Differences reflected on teacher's behavior	▪ The fact that students are more inclined to refrain from the teacher and parents as the age groups decrease	T1	1
	▪ Difference of sources of motivation	T5, T7, T14, T16	4
	▪ Differentiation of activities by grade level	T3, T6, T17	3
	▪ Differentiation of narrative techniques	T8, T10, T17	3
	▪ Difference in communication between lower and higher classes	T10, T11	2
	▪ Faster progress of subjects in grades 7 and 8	T3, T6	2
	▪ The fact that problem-solving is easier in lower classes compared to higher graders	T11, T14	2
	▪ The ease of communication and education with upper graders	T2	1
	▪ Long-time activities in small age groups	T3	1
	▪ Showing love for lower graders	T4	1
▪ To treat 8 <sup>th</sup> graders in a more rigid style	T1	1	

The following table includes the examples of direct quotations related to question 4 obtained from the interviews performed with participating teachers.

Table 11: Examples of Direct Quotations Related to Question 4

Categories	Examples of Direct Quotations
Effect of age groups/grade level	▪ <i>Age groups have influence. It is easier to solve the problem at young ages. Because it is easier to direct them, you can motivate them when they dislike the course. It becomes more difficult to motivate the students who dislike the course as they grow older. (T11)</i>
Differences reflected on teacher's behavior	▪ <i>I feel myself obliged to be rough-looking in the eighth grades because their teacher perceptions are different. I can act more angrily as a teacher, I realize that I mostly use this method although I do not want it too much. I would say that I am trying to make students involved in the course in this way. Although I do not think that it is very useful, I guess there is no another way to stop the eighth graders. (T1)</i>
	▪ <i>Well, while you can give a candy to a fifth-grade student because of answering the question correctly, I do not apply this method to the eighth grade for sure. Motive sources are different; because the motivating source of the eighth grades is the point. (T7)</i>
	▪ <i>While I can use a narrative expression for eight graders, I do not prefer it too much for the fifth graders. I usually try to show movies, animations to small groups. I play games, I perform amusing activities. (T8)</i>

It is seen in Table 12 that the answers given to the question about whether teachers associate the methods and techniques they use with a certain theoretical approach are collected under a single category. According to the findings obtained from the interviews, 9 teachers stated that they do not base the methods and techniques they use for the students who dislike mathematics on a certain theoretical basis. Some of the teachers stating this expression indicated that classroom size affects the approach used. 4 teachers stated that they used theories in certain parts of the course, 3 teachers stated that they used theories according to the class level. 3 different teachers also emphasized that the approach used varies by differences in learning. 3 teachers expressed their opinions on the need for the use of theories, and 2 teachers stated that they forgot the theories.

Table 12: Question 5. Do you base the methods and techniques you use on any theoretical basis (approach)? Why?

Categories	Codes	Teachers' Codes	f
Theories	▪ The non-use of a certain theory	T2,T3,T4,T5,T7,T8,T10,T13,T16	9
	▪ The effect of the classroom size on the approach used	T2,T5,T9,T10,T11 T5,T6,T7,T8	5 4
	▪ The use of theories in certain parts of the course	T1,T2,T9 T6,T11,T13	3 3
	▪ The use of theories according to the class level	T2,T3,T10	3
	▪ Change in the approach used according to learning differences	T1,T12	2
	▪ Questioning the necessity of the use of theories		
	▪ The fact that theories are forgotten		

The following table includes the examples of direct quotations related to question 5 obtained from the interviews performed with participating teachers.

Table 13: Examples of Direct Quotations Related to Question 5

Categories	Examples of Direct Quotations
Theories	<ul style="list-style-type: none"> <li>▪ <i>I use all theories in a mixed way according to the state and energy of the class. I sometimes become a behaviorist, sometimes a constructivist ... But if a class loves me, I mostly treat that class as egocentric, (teacher) centered, I become more student centered. Because it is more apparent that the class is more eager to get, listen and take something from me. (T1)</i></li> <li>▪ <i>I mean, it is very difficult to specify the methods and techniques with exact lines by saying that I use it here and I use it there ... In fact, this is something I have never thought. But when you asked, I thought, I mean, to be very teacher-centered is easier for us for crowded classes. (T2)</i></li> <li>▪ <i>... I am usually trying to be student-centered, I am trying to give support by the constructivist approach, but crowded classes become such uncontrollable that I realize that I have to get to the behaviorist theory.(T5)</i></li> <li>▪ <i>If I have to make a generalization like this, I think I mostly use the discovery method. This is the latest technique I'm using. I mostly use this technique while giving definitions. (T7)</i></li> <li>▪ <i>... every student does not have to understand mathematics. They may have different skills; to teach children based on those skills is easier for us and them. For example, I make students draw more shapes in the work that is related to the picture or I am trying to show in more ways. Or I teach as is to those who directly understand. It's much easier to get them done because their class size is also low." (T6)</i></li> </ul>



## **DISCUSSION AND CONCLUSION**

In this study, it was aimed to investigate the methods and techniques used by experienced mathematics teachers for the students who dislike mathematics. In addition, whether the methods and techniques used by teachers (if any) involve any difference is within the scope of this study. Finally, teachers' opinions on applying a certain theoretical approach while using the techniques in question were also included in the study. The findings obtained from the face-to-face interviews performed with experienced teachers were separately indicated for each question.

According to the findings obtained from the study, it is seen that 10 different codes were formed regarding the behaviors of students who dislike mathematics. In their study, Dursun and Dede (2004) investigated the reasons for the students' failure in mathematics and emphasized the consequence that the most important factor according to teachers' opinion is the fact that students should listen to the course well. In this study, it was stated that distracting their friends is the undesirable student behavior towards mathematics which was most frequently mentioned by teachers. This is followed by the behaviors of being engaged in some other things, not listening to course and losing concentration on the course. These results support the findings of Dursun and Dede (2004).

In the interviews performed with experienced teachers, the reasons for the negative attitudes of students towards mathematics were mentioned although it was not asked by the researcher. The prejudice in students is the most important reason for this. In addition, dislike of the teacher, coming to the course without making preparations and the imperfect knowledge originating from the primary school were also stated as the reasons. These findings are similar to the research findings of Dursun and Dede (2004). Şenol, Dündar, Kaya, Gündüz, and Temel (2015) investigated the causes of students' fear of mathematics with secondary school mathematics teachers. In their study, they emphasized that teacher's failure in endearing himself/herself is among the most frequently stated reasons. This result stated is consistent with the results of the study.

The techniques used by experienced teachers for the students who dislike mathematics are stated in two subcategories as student-centered and teacher-centered. It is clearly seen that the methods and techniques defined as student-centered aim to increase student motivation. However, it can be said that the techniques defined as teacher-centered aim to obligatorily direct students to course in a sense. Based on the observation obtained from the interviews performed with teachers who stated that they used such techniques, it was realized that the teacher basically implemented these kinds of techniques by considering that it was not correct. For instance, the teacher coded T1 mentioned that the technique of "frightening by parents", by his own statement, is very effective on students, but he also expressed his discomfort.

It was seen that experienced teachers frequently used the word of motivation and its derivatives. They aim to include at least some of students in the course by different applications performed to motivate them on the course. It is seen that motivational techniques resemble each other. The use of stickers is the most frequently mentioned technique. It was determined to be the most used and applied technique especially in motivating the students in the first year of the secondary education. It can also be thought that it is also used by secondary school teachers as it is an ordinary practice accustomed by the students in these classes in the primary school period. However, it was also stated by teachers that stickers are less effective in higher grades, the stamps on which reinforces are written encourage to solve the question.

In the question posed to the teachers who participated in the study regarding whether the methods and techniques they use for the students who dislike mathematics vary by gender, it was seen that almost all of the teachers perceived the gender difference on the difference in the general mathematics success of the students and gave the answers accordingly. However, the main point desired to be emphasized is related to whether the techniques applied to 'students who dislike

mathematics' vary by male and female students. Thus, the vast majority of the teachers shared their general opinions in the answers given to this question. Only teacher coded T11 answered this question as expected. The direct quotation of T11 is presented in Table 9.

Regarding the question above, it was seen that 10 teachers who participated in the study mentioned some differences between male and female students immediately after their statement indicating that there is no gender difference. This may be due to the fact that male and female students are not strikingly different in terms of their success in the course of mathematics. It can be explained by the fact that being calm or dynamic during the course, being tidy and attentive are not considered as a critical variable that determines mathematics success. This result supports similar findings in the literature (Dursun and Dede, 2004; Özkan and Yıldırım, 2013; Yücel and Koç, 2011).

Another finding of the study indicates that experienced teachers differentiate the methods and techniques used by them for the students who dislike mathematics according to the age groups of the students (class levels). The fact that the methods and techniques used are different should be considered normal because of the fact that the students mentioned in the study were secondary school students studying in the 5-8 grades when the differences in development periods are also taken into account. The difference which was most frequently mentioned by teachers is related to the motivation of the students. They also stated that class levels are effective in the selection and implementation of activities. It was also stated that teachers' lecturing techniques and communication with students vary by class levels.

### **Suggestions**

- The fact that mathematics teachers have knowledge about the factors affecting students' mathematics success (Dursun and Dede, 2004) will have a positive effect on the development of attitudes towards mathematics by students and on their success.
- As teachers' experiences increase, it becomes more and more difficult for them to follow contemporary approaches to mathematics education. Therefore, increasing the education faculties-school cooperation is thought to be important.
- It is necessary to make students gain simple concepts with concrete materials for students to like mathematics, to plan student-centered activities, and to create study environments in which each student can participate without time constraint by creating problem situations associated with daily life.
- To show students the amusing aspect of mathematics and not giving too many homework or exercises will also ensure the development of their positive opinions on mathematics.

**WJEIS's Note:** This article was presented at 5<sup>th</sup> World Conference on Educational and Instructional Studies- WCEIS, 27- 29 October, 2016, Antalya-Turkey and was selected for publication for Volume 7 Number 1 of WJEIS 2017 by WJEIS Scientific Committee.

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