THE EFFECTS OF MATHEMATICS TEACHERS AND ATTITUDES TOWARDS MATHEMATICS ON SUCCESS RATES OF 6TH GRADE STUDENTS İZMİR-BAYRAKLI SAMPLE

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Abstract: Students' success rates on mathematics lesson is still an important problem nearly all grades. The aim of the study is to analyze the relationship between success rates of 6th grade students on mathematics and loving mathematics lesson, finding the mathematics teacher boring, their attitudes towards mathematics. Students' attitudes towards mathematics are determined by using "Secondary School Students' Attitudes Scale Towards Mathematics" developed by Önal (2013). Students' success rates are based on the first term grades of 2018-19 school year. Sample group consists of 234 students studying 6th grade at three different secondary schools in İzmir, Bayraklı. As a result of applied Chi-square analysis, it is seen that there is a statistical significance between students' attitudes and success rates on mathematics ($X^2 = 43,847$, sd = 8, p < .001). Another result shows that the relationship between loving mathematics lesson and finding the teacher boring and success rates on mathematics are statistically significant ($X^2 = 25,075$, sd = 14, p < .05; X2 = 15,527, sd = 14, p = .050). One of the most important findings of the study is that 4th and 8th grade students loving mathematics, emerged as a result of the evaluation of TIMSS 2015 exam, had high success rates on mathematics.

Keywords: 6th grade students, attitude towards mathematics, loving mathematics lesson, success rates on mathematics

Introduction

Mathematics achievement at secondary schools continues to be a problem not only in Turkey, but also many countries. In particular, mathematics exam results of the 8th grade students at national and international levels clearly reveal this situation (MEB,2009; MEB, 2012; MEB,2018).

In the internationally held TIMMS – 2007 *(Trends in International Mathematics and Science Study)* exam, it is seen that the 8th grade Turkish students are below the general average of mathematics exam *(Mullis, Martin ve Foy, 2008).* According to the TIMMS 2015 evaluation report, a decrease in average mathematics performance of secondary school students is seen nearly in all countries, but in Turkey it is stated that decline is more (TEDMEM,2015).

The Programme for International Student Assessment, abbreviated as PISA, is used for testing and comparing the success rate of 15-year-old students' every three years since 1997. Three years earlier, in PISA exam, while Turkey was 48th country on the list, it finally recorded a positive development by going up to 42nd in 2018. Yet, nearly 37% of students were able to showed a performance at first level and under the first level. Moreover, the ratio of students performing at the top, fifth and sixth levels was 2.8 times below the OECD average (10.9%) with a total of 3.8%. It is worth exploring with which changes this developments achieved (TEDMEM, 2018).

Especially 8th grade students' low mathematics achievement led to numerous studies done about the parameters affecting success rate on mathematics (Bosker, 1999., Papanastasiou, 2000., Kiamanesh, 2004., Wang, 2004., Yayan ve Berberoğlu, 2004; Adesoji ve Yara, 2008., Demir, Kılıç ve Depren, 2009).

When those research are examined it is seen that variables such as students' studying habits (Küçükahmet, 1999), their physical and pscyhological problems, social environment, incompatibility to school, curriculum at school,

teachers' communication methods with students, their field knowledge and professional experience (Anderson, Ryan, ve Shapiro, 1989., Aydın, 1993., Centra ve Potter, 1980), class size (Wright, Horn ve Sanders,1997) are effective. Besides, there can be additonal reasons such as family issues, personal differences, methods used by teachers' in class (Bloom, 1976., Elçi, 2002., Jones and Jones, 2012., Özler, 1998).

In addition to all these reasons, parameters such as students' attitudes towards mathematics lesson and whether they love the lesson and the teacher are important. Attitude is a tendency attributed to an individual, and formed their psychological thoughts, emotions, and behaviors related to an object (Kağıtçıbaşı, 1999). Attitudes lead to positive or negative behaviours. It is stated that positive or negative attitudes towards mathematics affect mathematics achievement by 14% (Bloom, 1979).

Baykul (1990), who has significant studies about programme of mathematics and its success, states that many students in our country find mathematics difficult, have anxiety of failure and negative attitude. Previous studies show that students having positive attitudes are more successful than students having negative attitudes (Reyes, 1984., Ma, 1997).

Studies showing that students' who have positive perception towards their teachers have higher academic success and relationship between success and attitude is positive and significant (Akkoyunlu, 2003., Baykul, 1990., Bloom, 1976, Jones and Jones, 2012., Ma, 1997., Elçi, 2002., Özler, 1998), reveal how important the teacher factor to mathematics achievement. It is observed that evaluation of success rate on mathematics is mostly done at 8th grade students. Mathematics teachers usually change in the first term of the 6th grade at the beginning of secondary school. Whether the relationship between students' attitudes towards teacher and mathematics lesson and the success rates on mathematics has continued while they just started to form a perception about their teachers was the motivation of conducting research with 6th grade students.

The aim of the study is to examine the relationship between success rates of 6th grade students on mathematics, whether they love mathematics and their teacher, and their attitudes towards mathematics.

Questions to be Answered in the Study

Of the 6th grade Secondary School Students in İzmir, Karabağlar,

1-What is the success point of mathematics lesson?

2-Does the mathematics achievement of students differ according to mathematics teachers?

3-Is there a difference of mathematics success between students who do like and do not like mathematics?

4-Is there a relationship between mathematics achievement and students' attitudes towards mathematics?

5-Is there a relationship between mathematics achievement and finding the teacher boring?

MATERIAL AND METHOD

Universe and Sample of the Research

The universe of the research is the 6th grade students of 2018-19 academic year in İzmir while the sample group is 234 students attending 6th grade in the academic year of 2018-19 from three different secondary schools in İzmir, Karabağlar. Since the schools do not want their name to be given, the names are coded as "L" , "R", "U" and, schools, in themselves, are coded as class/branch and students.

Research Model

In this study, relational screening model was used in order to examine the relationship between students' academic success and their attitudes towards mathematics, loving mathematics lesson and teachers.

Data Collection Tools used in Research

"Attitudes Scale Towards Mathematics", developed by Nezih Önal, consists of 22 items. The scale items are 5-point likert type, "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree" and "Strongly disagree". Internal consistency coeffecient (Cronbach's alpha coeffiecent) was found as .90 for the entire scale (Önal, 2013).

In the academic achievement of 6th grade students, 1st semester grades are based on.

Data Analysis

Percentage and Chi-square test are used on data analysis. All of the statistical analysis were done in SPSS 17.0 program.

FINDINGS

1.What is the Success Point of the Students on Mathematics Lesson?

Table 1: Success rates of the 6th grade students on mathematics lesson

Mathematic Grade	Frequency	%	%Valid	% Total
0-45	**22**	9.4	**9.7**	9.7
46-54	**34**	14.5	**15.0**	24.8
55-69	60	25.6	**26.5**	51.3
70-84	47	20.1	**20.8**	72.1
85-100	63	26.9	**27.9**	100.0
Total	226	96.6	**100.0**	
No data	8	3.4		
Total	234	100.0		

Table of frequency analysis applied to see how many 6th grade students are failed/passed in mathematics lesson is given above. As it can be seen in the table, number of students having the lowest grades in the grade interval of 0-45 grade is 22 (9.7%), the number of the students in the grade interval of 46-54 is 34 (15.0%). Also, the number of the students in the grade interval of 55-69 is 60 (26,5%), the number of the students in the grade interval of 70-84 is 47 (20,8%) and the number of the students in the grade interval of 85-100 is 63 (27,6%).

2.Does the mathematics achievement of students differ according to mathematics teachers?

School, branch and students codes of 63 students with a mathematics grade in the interval of 85-100 are given on the table below. Since the schools do not want their names to be given, their names are coded as "L", "R", "U" and branches are coded as "A, B, C, D…"

Table 2: School, branch and students who have mathematics grade in the range of 85-100

School*Branch*	Number of students who have mathematics grade in the range of 85-100
LA	3
LB	3
RA	13
RB	7
RC	3
UA	4
UB	3
UC	10
UD	5
UE	2
UF	6
UG	3
Total	63

3.Is there a difference of mathematics success between students who do like and do not like mathematics?

Table 3: Difference of mathematics success between students who do like and do not like mathematics?

GRADE		The ones who do not like mathematics lesson	The ones who like mathematics at moderate level	The ones who like mathematics	Total	X^2	sd	p
0-45	N	11	5	4	20	25,075	14	.034
	%(column)	20,8	10,2	3,3	9,0			
46-54	N	17	9	8	34			
	%(column)	32,1	18,4	6,6	15,2			
55-69	N	13	23	24	60			
	%(column)	24,5	46,9	19,8	26,9			
70-84	N	8	8	31	47			
	%(column)	15,1	16,3	25,6	21,1			
85-100	N	4	4	54	62			
	%(column)	7,5	8,2	44,6	27,8			
Total	N	53	49	121	223			
	%(column)	100,0	100,0	100,0	100,0			

Students gave their answers based on 5-digit scale. Accordingly, 1 point (Strongly disagree) and 2 points (Disagree) represents the negative attitude (not loving the course). 3 points (Neither agree nor disagree) represents neither positive nor negative attitude, in other words, the moderate level. 4 points (Agree) and 5 points (Strongly Agree) represents the positive attitude (loving the course). So, points between 1 and 2.5 show the group who does not like mathematics, points between 3 and 3.5 show the group who like mathematics moderately and points between 4 and 5 show the group who likes mathematics.

The relationship between loving mathematics lessons and mathematics achievement is tested by Chi-square analysis. 11 students who did not answer the questions about whether they love mathematics or their mathematics grades are excluded, thus, analysis was made with 223 students.

Applied Chi-square test showed that there is a statistically significant relationship between success and loving mathematics lesson ($X^2 = 25,075$, sd = 14, p < .05).

4.Is there a relationship between mathematics achievement and students' attitudes towards mathematics?

Table 4: The relationship between mathematics achievement and students' attitudes towards mathematics

| GRADE | | Attitudes Towards Mathematics | | | | | | |
		Negative	Neither positive nor negative	Positive	Total	X^2	sd	p
0-45	N	5	9	3	17	43,847	8	.000
	%(column)	18,5	13,0	2,8	8,4			
46-54	N	9	12	8	29			
	%(column)	33,3	17,4	7,5	14,3			
55-69	N	8	22	23	53			
	%(column)	29,6	31,9	21,5	26,1			
70-84	N	3	17	24	44			
	%(column)	11,1	24,6	22,4	21,7			
85-100	N	2	9	49	60			
	%(column)	7,4	13,0	45,8	29,6			
Total	N	27	69	107	203			
	%(column)	100,0	100,0	100,0	100,0			

The relationship between mathematics achievement and students' attitudes towards mathematics is tested by Chi-square analysis. 31 students who did not answer the questions about attitude scale or their mathematics grades are excluded, thus, analysis was made with 203 students.

Applied Chi-square test showed that there is a statistically significant relationship between success and attitudes towards mathematics ($X^2 = 43,847$, sd = 8, p < .001).

Table 4 shows that students with negative attitudes have low mathematics grades while those with positive attitudes have high mathematics grades.

5.Is there a relationship between mathematics achievement and finding the teacher boring?

Table 5: The relationship between mathematics achievement and finding the teacher boring

GRADE		Not boring	Mathematics Teacher Neither boring nor interesting	Boring	Total	X^2	sd	p
0-45	N	14	1	4	19	15,527	8	.050
	%(column)	7,8	3,4	28,6	8,5			
46-54	N	24	6	4	34			
	%(column)	13,3	20,7	28,6	15,2			
55-69	N	48	9	3	60			
	%(column)	26,7	31,0	21,4	26,9			
70-84	N	42	3	2	47			
	%(column)	23,3	10,3	14,3	21,1			
85-100	N	52	10	1	63			
	%(column)	28,9	34,5	7,1	28,3			
Total	N	180	29	14	223			
	%(column)	100,0	100,0	100,0	100,0			

14 of total 231 students (6.1%) find their mathematics teacher boring. 186 of the students (%80.5) do not find their mathematics teacher boring.

The relationship between mathematics achievement and finding the teacher boring is tested by Chi-square analysis. 11 students who did not answer the questions about finding the teacher boring or their mathematics grades are excluded, thus, analysis was made with 203 students.

Applied Chi-square test showed that there is a statistically significant relationship between success and finding the mathematics teacher boring (X^2 = 15,527, sd = 14, p = .050).

When the distributions presented in Table 5 are examined, it is seen that most of the 14 students who find their mathematics teacher boring have low mathematics grades (N=4, 28.6%, grade=0-45; N=4, 28.6%, grade=46-54) or moderate (N=3, 21.4 %, grade=55-69), however, less of the students have high mathematics grades (N=2, 14.3%, grade=70-84; N=1, 7.1 %, grade=85-100). Also, it is seen that most of the 180 students who do not find their mathematics teacher boring have high grades (N=42, 23.3%, grade=70-84; N=52, 28.9%, grade=85-100). Thus, as a general tendency, it is concluded that those who find their mathematics teachers boring have low mathematics grades while those who do not find their mathematics teachers boring have high grades.

COMMENTS AND DISCUSSIONS

Based on the studies in the literature, hypothesis that there is a relationship between 6th grade students' mathematics achievement and their attitudes towards mathematics class and the teachers has been verified as a result of the research.

Considering the mathematics grades of 6th grade students studying at secondary school in 2018-19 school year, it is seen that only 9.7% of students are failed, 47.3% of them are moderate and good, 27.9% of them are very good. These results reveal that students' mathematics achievement are significantly moderate and good, and the number of very successful students are higher than those who are unsuccessful.

Since the schools do not want their names to be given, those three schools' names are coded as "L", "R", "U" and branches are coded as "A, B, C, D…" Considering the codes of 63 students with a mathematics grades between 85-100 showing the school, branch and student (Table. 2), it is seen that the group with the highest success grades between 85-100 is the "A" branch of "R" school. Success rates of students differ in the classes of different teachers who have different branches of the other two schools. Assuming that all the students at the same schools have the same average socio-economic levels and there are not any private students classes, this result suggests that teachers are effective on students' achievements.

In another research called "Examination Of Students' Attitudes Towards The Use Of Smart Board In Maths Classes Regarding Various Factors" it is stated that mathematics teachers have an important role on students' attitudes towards mathematics (Alkan, Güzel ve Elçi 2004). Also, the evaluation of TIMSS 2015 exam results point out that teachers are very effective in changing negative biases of students towards mathematics lessons and mathematics achievement (TEDMEM, 2015). These resultls match with our verified hypothesis.

Another results obtained from the study is that there is a statistically significant relationship between loving the mathematics lesson and mathematics achievement, those who find their teachers boring have lower grades than those who do not. The Report of TIMMS 2015 Results on Turkey Perspective reveal that students who love the mathematics lesson have higher averages, and when they pass to 8th grade they love mathematics less (TEDMEM,2015). That result interestingly matches to the result of our study.

In a descriptive study determining the students' attitudes towards mathematics teachers, it is revealed that factors such as students' level of understanding the lesson and difficulty, interest in mathematics, having fun in class, teaching methods of the teacher play an important role in attitudes towards mathematics lesson and teacher (Sullivan, 2008). In the analysis of TIMMS 2015 exam results it is stated that some parameters about teachers are effective in students' mathematics achievements (TEDMEM, 2015).

Another question looking for an answer in the study is that the relationship between students' mathematics achievement and their attitudes towards mathematics. In statistical analysis of data, a statistically significant relationship was found between students' mathematics achievement and their attitudes towards mathematics (X^2 = 43,847, sd = 8, p < .001). This result supports the results of other studies conducting with 7th and 8th grade students (Akkoyunlu, 2003., Baykul, 1990., Bloom, 1976., Jones and Jones, 2012) .

A statistically significant relationship between students' mathematics achievements and their attitudes towards mathematics lesson and teacher does not give any cause and effect relationship. In other words, it is difficult to make a judgment such as "Students are successful because they love mathematics lesson" or "Students love mathematics because they are successful". However, considering that asking for something is related to knowing and it is not possible to asking for unknown,it can only be wondered, it can be said that it is important mathematics subjects to be understood and known.

Additonally, giving the pleasure of success to students will increase the interest in the lesson and their teacher. Motivations of teachers, using appropriate teaching methods for the subjects, providing functional feedback to students during teaching process, giving appropriate homeworks which has educational value, interacting with their students and taking care of them, creating an environment full of trust and love, providing a support for

subjects they cannot understand will increase the success rates on mathematics. Summarizingly, teacher is said to play an important role in mathematics achievements.

Results of the study show that there is a statistically significant relationship between mathematics achievement of 6th grades students and their attitudes towards mathematics lesson and whether they love their mathematics teachers. Evaluation of TIMMS 2015 exam results draws attention that the rate of students who really love mathematics is higher in 4th grade than 8th grade. It is seen that students love mathematics less when they pass to 8th grade and students' self-confidence rate is lower in 4th grade than 8th grade (TEDMEM,2015). Therefore, it can be considered as not only a problem in Turkey but also a problem in every country attending TIMMS 2015 exam.

There are some studies showing that there is a relationship between mathematics achievements and types of school, level of family income, attitudes towards mathematics and doing a mathematics course. It is quiet difficult to control some factors such as level of family income and facilities of doing courses. Remedial measures relevant to teachers' field knowledge and pedagogical formation can be taken (Savaş, Taş, Duru,2010).

Teachers have important responsibilities for developing positive attitudes towards mathematics class. Studies revealing positive changes in students' attitudes as their positive experiences and success increase (Ruffell, Mason ve Barbara, 1998), show that we are not desperate about increasing students' success rates on mathematics.

SUGGESTIONS

Research findings regarding that students who love mathematics lesson and their teachers are more successful than those who do not, may contribute to solve the problem of failure in mathematics lesson. Teachers' field knowledge and their motivations, using appropriate teaching methods for the subjects, interest in mathematics, providing an entertaining learning process, giving appropriate homeworks which have educational value, interacting with their students and taking care of them, creating an environment full of trust and love in order to make students' ask for a support for subjects they cannot understand will increase the interest towards mathematics and teacher, therefore their success. Experimental studies with control groups can be done in order to see the results. Also, in-house training programmes can be organized for mathematics teachers about the topics mentioned above.

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