



THE IMPEDIMENTS ENCOUNTERED WHILE LEARNING MATHEMATICS BY EIGHT GRADE STUDENTS

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Abstract:

Mathematics is seen by many people as the best way to get a good life and a good career. It is also thought as an assistant to understand life and the world and to produce ideas about them. Therefore, new reform studies are being held to construct a new system that assists students to learn mathematics in a comprehensive way (Dursun & Dede, 2004). The importance of mathematics lessons and how to teach mathematics are increasing because of its potential to develop scientific thinking in accordance with the contemporary conditions and to implement these abilities into students' daily life (Yildiz & Uyanik, 2004). Despite these studies, most of the students perceive mathematics as a difficult lesson and get low grades from mathematics tests. Therefore, the impediments in the mathematics learning process have been seen necessary. The aim of this research is to take the students' opinions about the impediments while learning mathematics. The questionnaire prepared by researchers was given to 8th grade students. In the questionnaire, questions about mathematics lessons, mathematics teachers and mathematics learning process were asked to the students. The questions were edited by the experts' opinions. The impediments in the mathematics learning process were determined with regard to the students' opinions. The results will be presented and based on these results, some recommendations will be given.

Keywords: teaching mathematics, students' opinion, impediments, eight grade students

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1. Introduction

When we take a quick look at the definition of Mathematics, it is seen that Mathematics is a scientific field which allows us to think with numbers, realizes brain storming at best, analyses the relationships between numbers and various operations systematically, synthesis with numbers and operations at a level that will develop thinking system, forces to get beyond the limits of imagination, make us construct logical connections between numbers and concepts, teaches us to use our minds and while doing all these, shows us different ways to be able to find a solution.

Mathematics, in the simplest way, is defined as a science of patterns and systems (Goldenberg, Cuoco and Mark, 1998). In other words, dealing with mathematics is a process of problem solving by looking for a pattern and system. The important thing here is to be able to solve the problem after developing '*I can do mathematics*' sense by first internalizing the facts then loading into them our own understanding and finally discovering relationships, system and pattern. Teaching the fact that Mathematics lessons have different meanings other than being an obstacle that should be overcome depends on teaching its daily life functions properly.

In this context, the science of mathematics exists in the nature of human beings and it is a thinking system which they utilize even unintentionally from the first moment they start thinking and they improve whenever they use it. For this reason, all the educational activities should be analyzed at the end of each educational year to determine the deficiencies faced during mathematics teaching and to be able to find an answer for '*why this thinking system which should be developed in the process of an individual's education cannot be developed or has been developed very little*' to a certain extent.

Baykul (2004), generally expressed the purpose of teaching mathematics as; '*bringing learners mathematical skills and information required in everyday life, teaching them problem solving and a thinking style which deals with events with a problem solving approach*'. The main principles which should be followed to reach objectives in teaching mathematics are listed below:

- Constructing conceptual foundations
- Giving importance to pre-conditionality relationship
- Giving importance to key concepts
- Determining the duties of teachers and students clearly
- Utilizing environment in teaching
- Using research studies
- Developing positive attitudes towards Mathematics (Baykul, 2004).

The failure to obey these principles which are summarized in the above list forms the foundation of the difficulties faced in teaching mathematics. Insisting on using traditional teacher-centered teaching method and the fact that adoption of new approaches by teachers and students takes time delay finding solutions to the

difficulties faced in teaching mathematics. Students have difficulties to acquire abstract concepts. It is one of the reasons why mathematics is perceived as difficult by students. However, this difficulty can be overcome or reduced if abstract mathematical concepts are presented to students by concretizing those concepts and by presenting them through using concrete tools (Baykul, 1999).

In this regard, the purpose of this study is to present the impediments faced in teaching mathematics from students' perspectives. In accordance with this purpose, the opinions of the students were presented through the questions which were created by taking the opinions of an expert and grouped under a few categories.

By considering these points the research problem can be stated as '*What kind of impediments can be faced in teaching Mathematics? What do students think about these impediments faced in learning this lesson?*' The answers of the following sub-problems will be searched in accordance with this problem:

1. In what ways do the students prefer learning mathematics?
2. What do students think about the reasons of mathematics fear and difficulties in learning Mathematics?
3. What do students generally think about their Mathematics teachers?
4. Which methods should students follow while studying mathematics?
5. What do students think about the language used by their teachers while teaching mathematics?
6. Are Mathematics teachers sufficient in terms of content knowledge and Do they improve themselves? What do students think about this?
7. Is there an effect of crowded classrooms on students while learning mathematics? What do students think about this?
8. Can students use different resources other than text books?
9. What are the opinions of students about being a Mathematics teacher in the future?
10. What is the effect of TEOG test on mathematics teaching at schools? What do students think about this?
11. Are students getting bored while learning mathematics?
12. Do students believe that they learn mathematics permanently?

Methodology

Structured interview method was used in this study. Interviews are one of the most used methods in qualitative studies and they are divided into three types as structured, semi-structured and unstructured (Böke and others, 2009).

The purpose of structured interviews consisting of a series of pre-determined questions and answers is to identify the differences and similarities provided by the interviewed individuals and to make comparisons according to them (Yıldırım and

Şimşek, 2013). 181 8th grade students (ages 13-14) from five different schools participated in this study (Table 1). TEOG test was influential to determine the study group among 8th grade students.

Table 1: The Distribution of the students participating in the study

Gender	Frequency	Percentage	Mathematics Average Scores
Female	89	49,2	64,96
Male	92	50,8	62,25
TOTAL	181	100	63,60

As it can be seen from Table 1, the number of female and male students participating in this study is evenly distributed. The average scores of the participating students which they obtained from Mathematics lesson can be seen in Table 1.

The opinion form which was prepared by the researcher was used as a data collection instrument. In this form, there are 12 questions which are evaluated as to be effective in mathematics lessons, teachers and discouraging students to deal with Mathematics.

The opinions of the students were collected through opinion forms in black and white. The data collected were organized in tables by calculating their frequency and percentage values. While interpreting the data, graphics were used.

Findings

Each question which was used for collection students' opinions was analyzed one by one. The answers provided for the questions in the form were grouped under related categories and their frequency and percentage distributions were obtained.

Table 2: In what ways do you prefer to learn Mathematics?

Answers	Frequency	Percentage
During the Lesson	112	61,9
Studying alone	52	28,7
Studying with a group	65	35,9
Learning by doing	41	22,7
With private lessons	28	15,5
Discovering Mathematical situations in the nature	11	6,1
With the help of games and ciphering	43	23,8
I cannot learn Mathematics	29	16

The answers of the students for the question of "In what ways do you prefer to learn Mathematics?" were displayed in Table 2. As it can be seen from the table, most of the students (61,9 %) prefer to learn mathematics during the lessons.

Table 3: What do you think about the reasons of the difficulties in learning Mathematics and students’ fear against Mathematics?

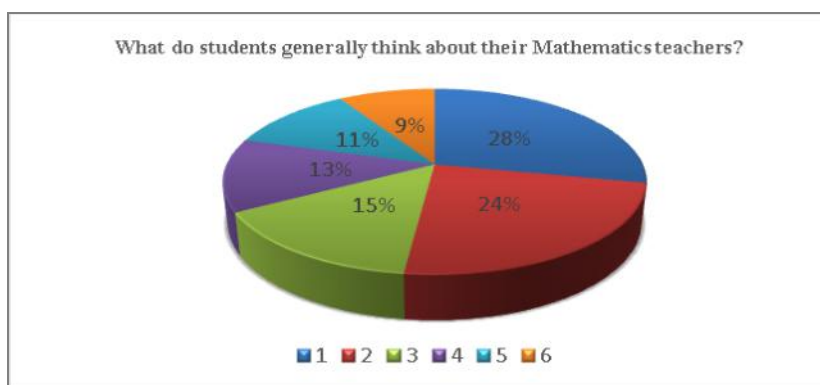
Answers	Frequency	Percentage
Intensive and tedious curriculum	102	56,4
Discouragement by teachers	42	23,2
Not teaching the basic philosophy of the Mathematics	21	11,6
Insufficient communication between teachers and students	45	24,9
Students hate mathematics	91	50,3
Believing that mathematics is unnecessary	51	28,2
Fear of having low marks	105	58
Not having somebody in the family to help lessons	43	23,8
The competitive environment among students	25	13,8

The answers of the students for the question of “*What do you think about the reasons of the difficulties in learning Mathematics and students’ fear against Mathematics?*” were displayed in Table 3. Most of the students (58%) think that the difficulties and fear in learning mathematics come from the fear of having low marks. Also, intensive and tedious curriculum and the fact that students hate mathematics are highly preferred items among the reasons of the difficulties.

Table 4: What do students generally think about their Mathematics teachers?

Answers	Frequency	Percentage
Strict and authoritarian	51	28,2
Helpful and caring	43	23,8
Scary	27	14,9
Friendly and cute	23	12,7
Lack of communication and boring	21	11,6
Fair and Democratic	16	8,8
TOTAL	181	100

The answers of the students for the question of “*What do students generally think about their Mathematics teachers?*” were displayed in Table 4. While 28.2 % of the students expressed that their Mathematics teachers are strict and authoritarian, 23,8 % of the students told that their teachers are helpful and caring.



As seen from the above graphic, most of the students found negative adjectives for their Mathematics teachers. The 1st, 3rd and 5th circles are showing negative adjectives. The total number circles reflecting negative adjectives covers more than half of the whole circle.

Table 5: Which methods do you follow while studying Mathematics?

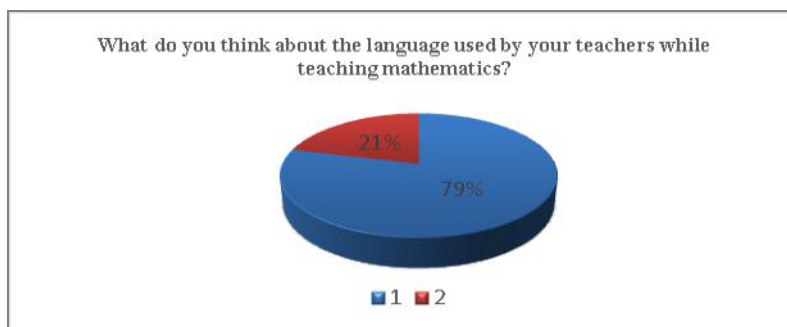
Answers	Frequency	Percentage
First studying a subject then solving sample questions	76	42
Reading like studying a verbal lesson	31	17,1
Memorizing the subjects and samples in the notebook	52	28,7
Watching videos on the Internet about the subject	73	40,3
Having correlations with other subjects to comprehend the subject integrally	22	12,2
Together with friends	43	23,8
I do not know how to study Mathematics	42	23,2

The answers of the students for the question of “Which methods do you follow while studying Mathematics?” were displayed in Table 5. 42 % of the students prefer first to study a subject then to solve sample questions. 40,3 % of the students stated that they prefer to watch videos on the internet about the subject.

Table 6: What do you think about the language used by your teachers while teaching mathematics?

Answers	Frequency	Percentage
Comprehensible	143	79
Incomprehensible	38	21
TOTAL	181	100

The answers of the students for the question of “What do you think about the language used by your teachers while teaching mathematics?” were displayed in Table 6. 79 % of the students expressed that they found the language used by their Mathematics teachers as comprehensible.

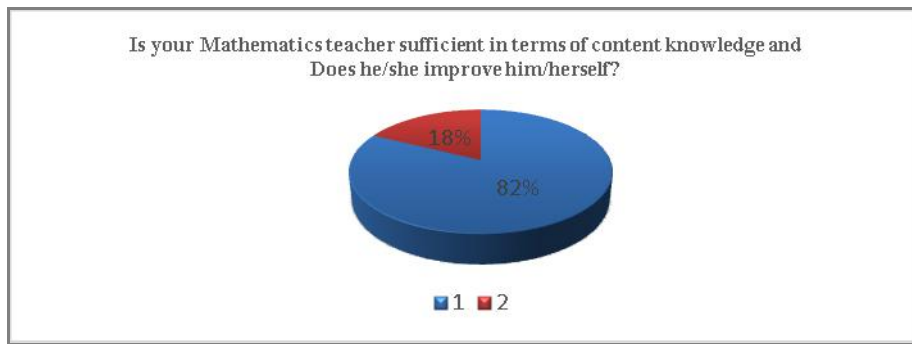


As seen from the graphic above, most of the students think that their teachers are using a comprehensible language while teaching mathematics.

Table 7: Is your Mathematics teacher sufficient in terms of content knowledge and does he/she improve him/herself?

Answers	Frequency	Percentage
Yes	149	82,3
No	32	17,7
TOTAL	181	100

The answers of the students for the question of “*Is your Mathematics teacher sufficient in terms of content knowledge and Does he/she improve him/herself?*” were displayed in Table 7. 82,3 % of the students expressed that their mathematics teachers are sufficient in terms of content knowledge and they improve themselves.

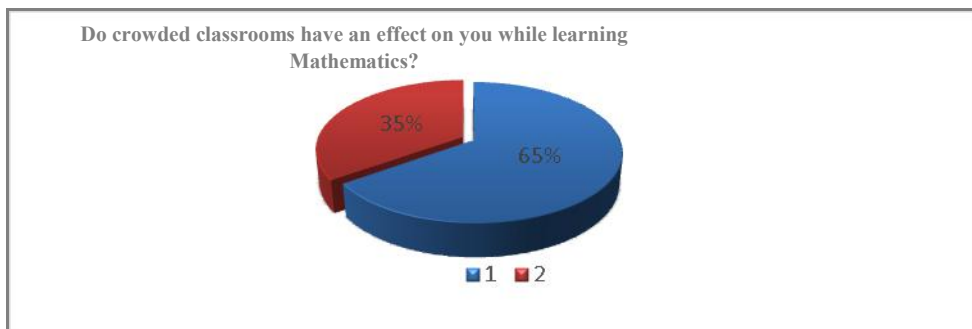


As seen from the above graphic, most of the students think that their mathematics teachers are sufficient in terms of content knowledge and they improve themselves.

Table 8: Do crowded classrooms have an effect on you while learning Mathematics?

Answers	Frequency	Percentage
Affecting	118	65,2
Not Affecting	63	34,8
TOTAL	181	100

The answers of the students for the question of “*Do crowded classrooms have an effect on you while learning Mathematics??*” were displayed in Table 8. 65,2 % of the students stated that having a crowded classroom has an effect on him/her while learning mathematics.

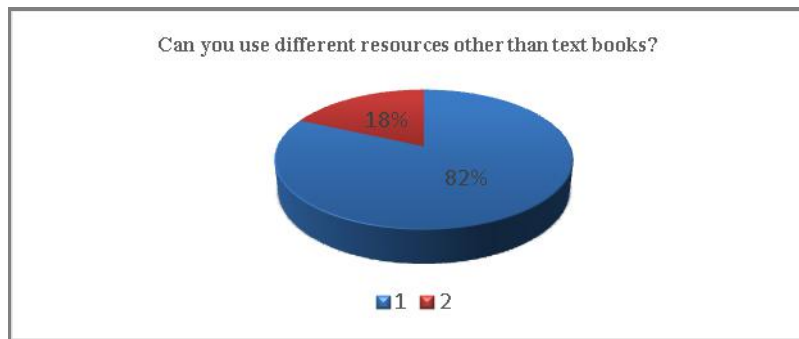


As seen from the above graphic, most of the students are affected negatively by the crowded classrooms while learning mathematics.

Table 9: Can you use different resources other than text books?

Answers	Frequency	Percentage
Yes	148	81,8
No	33	18,2
TOTAL	181	100

The answers of the students for the question of “Can you use different resources other than text books?” were displayed in Table 9. 81,8% of the students stated that they could use different resources other than text books.

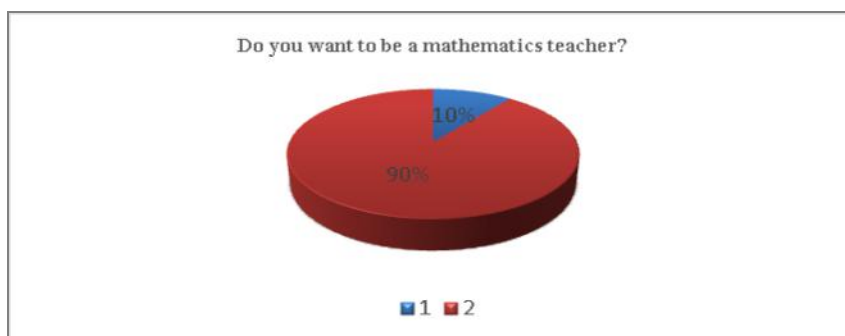


As seen from the above graphic, most of the students can use different resources other than text books.

Table 10: Do you want to be a mathematics teacher?

Answers	Frequency	Percentage
Yes	19	10,5
No	162	89,5
TOTAL	181	100

The answers of the students for the question of “Do you want to be a mathematics teacher?” were displayed in Table 10. 89,5 % of the students expressed that they did not want to be a mathematics teacher.

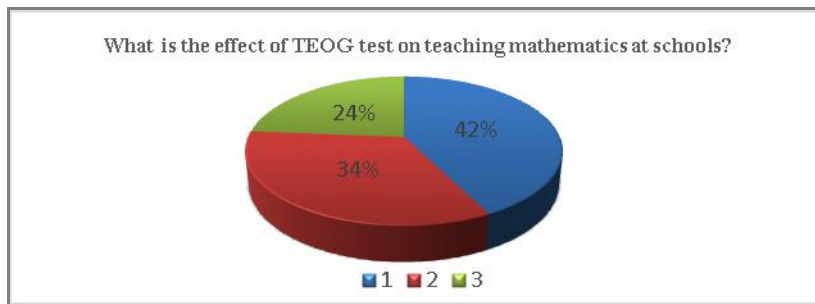


As seen from the above graphic, most of the students do not want to be a mathematics teacher.

Table 11: What is the effect of TEOG test on teaching mathematics at schools?

Answers	Frequency	Percentage
It does not matter	77	42,5
Have negative effects	61	33,7
Have positive effects	43	23,8
TOTAL	181	100

The answers of the students for the question of “*What is the effect of TEOG test on mathematics teaching at schools?*” were displayed in Table 11. While 42,5 % of the students stated that TEOG test did not have an effect on teaching mathematics at schools, 33,7 % of them stated that it had negative effects.

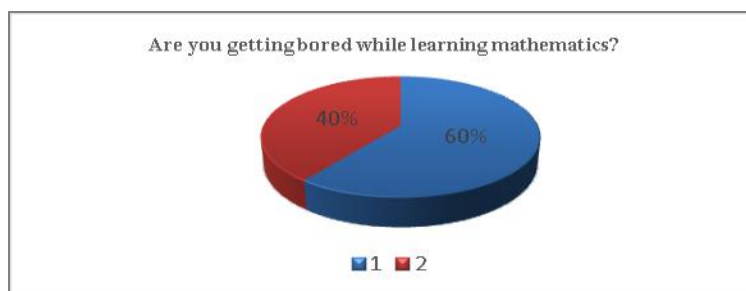


As seen from the above graphic, most of the students think that TEOG test do not have an effect on teaching mathematics at schools.

Table 12: Are you getting bored while learning mathematics?

Answers	Frequency	Percentage
Yes	109	60,2
No	72	39,8
TOTAL	181	100

The answers of the students for the question of “*Are you getting bored while learning mathematics?*” were displayed in Table 12. 60,2 % of the students stated that they got bored while learning mathematics.

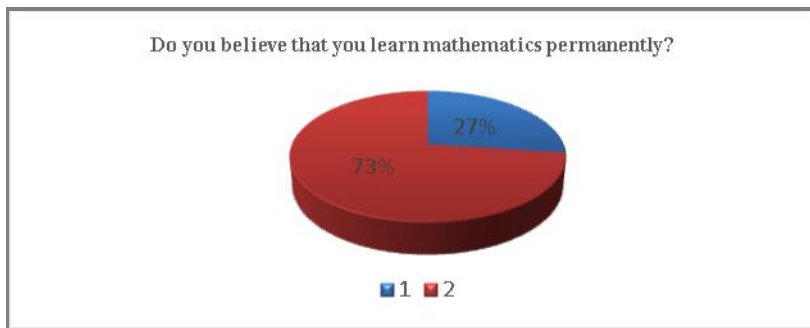


As seen from the above graphic, most of the students express that they are getting bored while learning mathematics.

Table 13: Do you believe that you learn mathematics permanently?

Answers	Frequency	Percentage
Yes	49	27,1
No	132	72,9
TOTAL	181	100

The answers of the students for the question of “Do you believe that you learn mathematics permanently?” were displayed in Table 13. 72,9 % of the students stated that they did not learn mathematics permanently.



As seen from the above graphic, most of the students believe that they cannot learn mathematics permanently.

Conclusions

- Most of the students (61,9 %) prefer to learn mathematics during the lessons.
- Most of the students (58%) think that the reason of difficulties in learning mathematics and the fear of mathematics stem from the fear of having low grades. Besides, the intensive and tedious curriculum and the fact that students hate mathematics are among the most preferred items regarding the difficulties in learning mathematics.
- While 28,2 % of the students expressed that their mathematics teachers are strict and authoritarian, 23,8% of them stated that their mathematics teachers are helpful and caring.
- 42% of the students prefer first to study the subjects and then to solve sample questions. 40,3 % of the students stated that they preferred to watch videos on the internet about the subjects that study.
- 79 % of the students expressed that their teachers are using an understandable language while teaching mathematics.

- 82,3 % of the students expressed that their mathematics teachers are sufficient in terms of content knowledge and they are improving themselves.
- 65,2 % of the students stated that crowded classrooms have an effect on learning mathematics.
- 81,8 % of the students stated that they can use some other resources apart from text books.
- 89,5 % of the students stated that they do not want to be a mathematics teacher.
- While 42, 5 % of the students stated that TEOG test do not have an effect on teaching mathematics, 33,7 % of them stated that it has a negative effect on teaching mathematics.
- 60,2 % of the students stated that they get bored when learning mathematics.
- 72,9 % of the students expressed that they believe that they cannot learn mathematics permanently.

In a part of study carried out with teachers and students and conducted by Demirtaş and Aydın (2007) the answers of the 5th and 8th grade students provided for a survey was analyzed by asking similar questions used in this study. Most of the students stated that they love learning mathematics. 25 % of the grade students stated that they have difficulties in learning mathematics because of teaching mathematics puzzlingly and unclearly, interrupting lessons frequently (17 % of the students), not understanding lesson (17 % of the students), crowded classroom (8 % of the students), not be able to solve mathematics (8 % of the students), fear of standing up in front of the classroom (8 % of the students) and teaching the subject quickly (8 % of the students).

Recommendations

It is possible to make following suggestions in accordance with this study:

- ☑ More concrete information about how the mathematical information can be used in daily life should be transferred to students.
- ☑ Teachers should follow new developments in teaching mathematics and they should not ignore to transfer these new developments to their students.
- ☑ Students should be provided a teaching away from rote learning and how and in what ways they will use this learnt subject should be explained to them.
- ☑ Students should be encouraged to participate in projects and competitions like Olympiads and they should be supported and helped in researches.
- ☑ Students should acquire skills about using mathematical language and expressing their thoughts by using mathematics.
- ☑ Instead of discriminating students who have difficulties in learning mathematics, these students should be provided extra care.
- ☑ The homework used in the classroom should help students to conduct researches and keep them away from rote learning. In the lessons, it should be avoided to

give homework in which students will solve questions rotely by looking at the examples.

- ☑ Teaching should not be carried out with only two or three students in the classroom, whole class participation should be provided and teachers should help students to participate lessons.
- ☑ Teachers should make lessons more interesting and to provide this atmosphere they should use jokes properly. They should refresh students' memories and make them relax so that they can provide an atmosphere in which students can ask whenever they do not understand something. While doing this, the balance between teachers and students should be considered.
- ☑ Teachers should make students feel that they are good in their subjects through entering lessons with preparation so that they can have the confidence of the students.
- ☑ Since the crowded classrooms in public schools make teaching difficult, there should be students for decreasing the number of students per classroom.
- ☑ Carrying out in depth studies on this topic should be encouraged.

References

1. Baykul, Y. (1999). İlköğretimde Matematik Öğretimi, Öğretmen El Kitabı: Modul 6, Ankara, Milli Eğitim Yayınları.
2. Baykul, Y. (2004). İlköğretimde Matematik Öğretimi (6-8. Sınıflar İçin), Ankara, Pegem A Yayıncılık.
3. Böke, K., Özdoğan, A., Sevinç, B., Güler, C., Büker, H., & Demir, İ. (2009). Sosyal Bilimlerde Araştırma Yöntemleri. İstanbul: Alfa yayıncılık.
4. Civelek, Ş., Meder, M., Tüzen, H. & Aycan, C. (2003). Matematik Öğretiminde Karşılaşılan Aksaklıklar <http://www.matder.org.tr/Default.asp?id=101>
5. Demirtaş, T., & Aydın, S. (2007). İlköğretim Okullarında Matematik Dersinin Öğretiminde Ve Öğreniminde Karşılaşılan Sorunlar ve Çözüm Önerileri (Bitlis İli Tatvan İlçesinde Bir Araştırma). Yayımlanmamış Yüksek Lisans Tezi.
6. Dursun, Ş. & Dede, Y. (2004). The factors affecting students' success in mathematics: Mathematics teachers' perspectives. Gazi University. The Journal of the Education Faculty, 24(2), 217-230.
7. Goldenberg, E.P., Cuoco, A.A. & Mark, J. (1998). A role for geometry in general education. In R. Lehrer & D. Chazan (Eds.) Designing Learning Environments for Developing Understanding of Geometry and Space. Mahwah, NJ: Lawrence Erlbaum Associates, 3-44.

8. Yenilmez, K. & Avcu, T.(2009). İlköğretim Öğrencilerinin Mutlak Değer Konusunda Karşılaştıkları Zorluklar, Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, 12, 80-88
9. Yenilmez, K. & Uysal, E. (2007). İlköğretim Öğrencilerinin Matematiksel Kavram ve Sembollerini Günlük Hayatla İlişkilendirebilme Düzeyi. Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 24, 89-98.
10. Yıldırım, A. & Şimşek, H. (2013). Sosyal Bilimlerde Nitel Araştırma Yöntemleri. 9. Baskı. Ankara: Seçkin Yayıncılık.
11. Yıldız, I. & Uyanık, N. (2004) Günümüz Matematik Öğretimi ve Yakın Çevre Etkileri. Kastamonu Eğitim Dergisi, 12(2), 437-442.

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