

## STUDENT TEACHERS' VIEWS ON THE ROLE OF MOTIVATION FOR MATHEMATICS TEACHING AND LEARNING\*

### ADAY ÖĞRETMENLERİN MATEMATİK ÖĞRETİMİ VE ÖĞRENİMİNDE MOTİVASYONUN ROLÜ KONUSUNDA GÖRÜŞLERİ

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**ABSTRACT:** There are many factors affect mathematics teaching and learning. Teachers' beliefs, perceptions, attitudes and many other factors play important roles for mathematics teaching and learning. Research indicates that teachers' behaviors directly affect pupils' behavior. This suggests that if teachers have positive views on mathematics, children in their classes might have positive attitudes towards mathematics. So, what teachers do in the classrooms is very important. Therefore student teachers' training is also very important. This study aimed to take student teachers' view on mathematics teaching and learning. For this aim student teachers were asked about the role of motivation, in particular. Interview as qualitative research technique was used and student teachers who were in their last year of teacher training program were interviewed in this study. Limited sample of student teachers were interviewed for gathering detailed data. Only findings belong interviews are presented in this study.

**Keywords:** Motivation, student teachers, mathematics.

**ÖZET:** Matematik öğretimini ve öğrenimini etkileyen pek çok faktör vardır. Öğretmenlerin tutumları, düşünceleri, algıları ve diğer bir çok faktör matematiğin öğretiminde ve öğrenilmesinde önemli rol oynamaktadır. Bu konudaki araştırmalar öğretmen davranışının öğrenci davranışını doğrudan etkilediğine işaret etmektedir.

Eğer öğretmenler matematiğe karşı olumlu görüşler içinde ise, öğrencilerinin matematiğe yönelik tutumlarını olumlu etkileyeceklerdir. Sayılan nedenlerle öğretmenlerin sınıfta yaptıkları her davranış çok önemlidir. Bu da öğretmen adaylarının bu konularda iyi bir eğitimden geçmeleri gereğini ortaya koymaktadır. Bu çalışma özellikle aday öğretmenlerin motivasyon konusundaki görüşlerini belirlemeyi amaçlamıştır. Nicel araştırma tekniği olan anket ve nitel araştırma tekniği olan görüşme kullanılarak adaylardan (ilköğretim matematik öğretmenliği son sınıf öğrencileri) konuya yönelik görüşleri alınmıştır. Bu çalışmada sadece görüşmeye ilişkin bulguları tartışılmaktadır.

**Anahtar Sözcükler:** Motivasyon, aday öğretmenler, matematik.

## 1. INTRODUCTION

Motivation is a cluster of internal and external drive, wishes and desires, which have an influence on, manipulate, strengthen and supervise human behavior. Motivation is related to wonder, interest and competition as well as fundamental human needs. Entwistle (1987) defines motivation as "it is a concept which has been used by both psychologists and educationalists to explain differences among learners in the amount of effort they put into their learning".

Motivation types can be grouped under three aspects:

### 1.1. Primary and Secondary Motives:

Primary motives are the ones which depend on the drives that have a biological base. Primary motives can be observed in all livings. Some of primary motives stem from some known physiological changes in the body such as hunger and thirst and they are unlearned motives whereas secondary motives have psychological and social foundations. Secondary motives are, therefore, also called "social motives". These motives can be both learned and unlearned motives.

### 1.2. Situational and Continuous Motives:

Situational motive emerges with the effect of a certain situation and is temporary. Continuous motive is permanent, on the other hand. For ins-

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tance, the motive of a student who does not like mathematics course but study mathematics course because he will have an examination is situational. But the motive of a student, who is interested in mathematics course and study mathematics course because he is willing to learn, is continuous.

### 1.3. *Internal and external motives:*

External motive emerges as a result of the effects coming from outside, such as, rewards, punishment, pressure and request. For instance, a child, who starts to eat upon her mother's statement that he cannot play games unless he eats, is motivated externally. The factor causing this child to be motivated is not that he likes eating but that he uses eating as a tool for playing. Internal motive, on the other hand, emerges as a result of the effects from inside, such as interest, wonder, needs, etc. For instance, if a child interested in mathematics study mathematics before being told to study, he is motivated internally. In situations where internal motivation is not existent, external motivators may be needed.

Teachers have many responsibilities such as planning lessons, managing class (Çakmak1999, 2001b). One of the essential tasks of them is obtaining motivation in the classroom. However, many experienced and inexperienced teachers have some difficulties on motivation in the classrooms. Petty (1993, p.32) indicates very meaningful and important point in this context:

*"...Motivation is regarded by experienced and inexperienced teachers alike as a prerequisite for effective learning, and the greatest challenge that many teachers face is to make their students want to learn. If students do not want to learn, their learning efficiency will be low that they may learn virtually nothing. If you know how to motivate students, you can hugely increase their learning rate..."*

As Petty indicate, to know what to do in order to motivate students is very important for both experienced and inexperienced teachers. Like Petty, Capel et al., (1995) highlighted that in order to obtain motivation in the classrooms; student teachers

need to understand teaching techniques effectively. On the other hand, many studies suggest that there might be some differences and also similarities in applying teaching skills in practice (Çakmak, 1999).

This present study is aimed to take teachers' views on the role of motivation for teaching and learning mathematics. Three main factors affected this decision:

- (1) Mathematics is one of the core subjects at primary level
- (2) Teaching mathematics is not an easy task.
- (3) One of the essential requirements is to know what motivation is and apply suitable strategies in teaching mathematics in the classroom atmosphere.

## 2. METHOD

Mainly, qualitative research technique was utilized in the study . Interview was used as qualitative research technique .The interview was done in order to determine the views of the student teachers regarding the role and importance of motivation in mathematics instruction .Literature scanning made for the subject was utilized while preparing interview questions.In total , 93 undergraduate students of Gazi University , Gazi Education Faculty Primary Education Department Mathematics teaching division took part in the study.

In order to acquire deep information , a limited number of students were interviewed in the study. There was a care in the selection of the student teachers to take part in the study who were successful in their own departments in direction of the views of their advisers . Seven student teachers in total ( 5 female , 2 male ) who were selected with the help of their advisers were interviewed.

## 3. FINDINGS

In this section, findings of this study are presented. As highlighted in this study, the findings based on interview will be given. The answers of the seven candidate teachers to each question in the interview form are given below.

By the first question student teachers were asked that “What are the important factors in mathematics instruction for you? Please write down at least five factors that you attach importance”. Student teachers responses to this question were given below.

When the answers of the candidate teachers to the first question are analyzed it appears that they

point to many factors that are effective. The things that they stated at most were concretizing the events, teacher-student relations and understanding the levels of the students. However, only one student drew attention to ensuring motivation among the effective factors in mathematics instruction. This can be interpreted in a way that the students do not attach much importance to motiva-

**Table 1.** Student teachers' responses on question one during interview.

| Teacher interviewed and their gender | Student teachers' responses   |
|--------------------------------------|---|
| 1<br>(Female)                        | <ol style="list-style-type: none"> <li>1) To be able to concretize the events</li> <li>2) To be able to create models for mathematics instruction</li> <li>3) To be able to comprehend the interpretation of the student (empathy)</li> <li>4) To adapt the problems to the everyday life</li> <li>5) To provide care and affection</li> </ol>  |
| 2<br>(Female)                        | <ol style="list-style-type: none"> <li>1) Attitude of the teacher towards the students</li> <li>2) Instruction methods of the teacher</li> <li>3) The way in which the teacher manages the lessons</li> <li>4) Teacher-student relations</li> <li>5) Source books</li> </ol>  |
| 3<br>(Female)                        | <ol style="list-style-type: none"> <li>1) To make students comprehend the numbers</li> <li>2) Increasing the number of the examples</li> <li>3) Determining the levels of the students</li> <li>4) Behaviors of the students should be awarded</li> <li>5) To enable students to get rid of the stereotyped feelings, for example, fear of mathematics</li> </ol>   |
| 4<br>(Male)                          | <ol style="list-style-type: none"> <li>1) Make the students adopt that mathematics is not as difficult as usually told</li> <li>2) Mathematics is an abstract lesson and this makes the instruction process difficult</li> <li>3) Giving the lessons concretizing them</li> <li>4) Using various activities related to the subject (riddle, puzzle, etc.)</li> <li>5) Assigning students with homework since there exists a time limit for the lessons</li> </ol> |
| 5<br>(Female)                        | <ol style="list-style-type: none"> <li>1) Manner and attitudes of the teacher towards the students</li> <li>2) The way he/she explains the subjects</li> <li>3) Infrastructure of the students in mathematics</li> <li>4) Providing motivation</li> <li>5) Handling the lessons taking the level into consideration</li> </ol>  |
| 6<br>(Male)                          | <ol style="list-style-type: none"> <li>1) Communication of the teacher with the students</li> <li>2) Lesson teaching methods of the teacher</li> <li>3) At what level the students are interested in mathematics</li> <li>4) Preparation of the teacher before the lesson</li> <li>5) The place of the teacher in the eyes of the student</li> </ol>  |
| 7<br>(Female)                        | <ol style="list-style-type: none"> <li>1) Teaching method of the teacher</li> <li>2) Source books</li> <li>3) To make the students feel that mathematics is not a difficult lesson</li> <li>4) Time</li> <li>5) Encourage the students to solve a lot of exercises</li> </ol>   |

tion among the factors that make the mathematics instruction effective.

The second question asked the student teachers that “What is motivation according to you? At what level, do you think motivation is important in mathematics instruction?”. The answers given to this question are given below.

When the answers given to this question are examined it can be concluded that some candidates do not regard themselves sufficient enough regarding at what level they would ensure motivation in their classes whereas some of them do regard themselves sufficient enough. Taking into consideration this situation, we can remark that the students must be equipped with necessary information and skills regarding how they will ensure motivation in the classes in mathematics inst-

ruction. The third question presents data that supports this finding.

The third question directed student teachers was that “It is known that students find mathematics more difficult compared to other lessons. Taking into consideration the reasons like this and such, what are you planning to do in order to motivate students for mathematics learning in your own class?”

When the answers of the students to the third question are analyzed it appears that they point to different dimensions. They presented views that they would further control the class through concretizing the abstract situations, through creating models for mathematics instruction, through making explanations by giving examples from daily life, through organizing various activities, through

**Table 2.** Student teachers’ responses on question two during interview.

| Teacher interviewed and their gender | Student teachers’ responses   |
|--------------------------------------|---|
| 1<br>(Female)                        | <i>“Mathematics is a scientific branch that requires attention and care. Lack of knowledge and points that are not attributed enough care lead to big mistakes in problem solving. Therefore, I believe the crucial importance of motivation in mathematics”.</i>   |
| 2<br>(Female)                        | <i>“Motivation is referred to as concentrating on a subject or object and directing all the attention towards that subject or object. We believe that motivation has a crucial place in mathematics instruction. Since mathematics is an abstract lesson, it is a must for the students to be motivated for the lesson in order for them to understand the subject. According to me, motivation is a must not only for mathematics but also for all the other lessons. However, since mathematics seems to be a difficult lesson, one should be motivated in order to comprehend the lesson”.</i> |
| 3<br>(Female)                        | <i>“Motivation can be used in its sense motivating the students for the lesson. Motivation is extremely important for the students to concentrate and give all their attention in order to comprehend the lesson well. Here, the teachers face a very important task”.</i>  |
| 4<br>(Female)                        | <i>“Motivation has an important place in mathematics as in all the other lessons. It makes the students willing towards the lesson. If it is used in a favorable way, for example, when we say ‘Well done’ to a student who gave a right answer for a question, this makes the student willing to solve the other question, too”.</i>   |
| 5<br>(Female)                        | <i>“To become adapted to a subject. I believe that the teacher can arouse motivation. I think it is very effective, especially for mathematics. Because this is a lesson that must be listened to with attention”.</i>  |
| 6<br>(Male)                          | <i>“Motivation is a way of adapting students to the lesson. It is quite important in mathematics instruction. Because mathematics is a lesson that one considers quite biased. Therefore, the teacher needs to motivate the student for the lesson and make him/her like it”.</i>   |
| 7<br>(Female)                        | <i>“For me, motivation is a matter of adaptation that enables one to carry out his/her duty in the best way and in the shortest time. Motivation in mathematics enables the students to comprehend the subject in the most favorable way and like and have an interest through correlating it to other subjects and making the students believe that they achieve something in mathematics”.</i>  |

**Table 3.** Student teachers' responses on question three during interview.

| Teacher interviewed and their gender | Student teachers' responses  |
|--------------------------------------|--|
| 1<br>(Female)                        | <i>"The most important factor is to be able to concretize the events. Because, it is hard to comprehend and make the students comprehend the abstract things in elementary education. Except for this, it is a must to create models in mathematics instruction"</i> .   |
| 2<br>(Female)                        | <i>"To try to teach mathematics through examples from daily life will make the students motivated. The students may fed up with numerical expressions. Boring stereotyped teaching bothers everyone. Therefore, various activities can be carried out."</i>  |
| 3<br>(Female)                        | <i>"Firstly starting from the easy subjects, in a way that the students can comprehend difficult subjects can be taught step by step through various methods"</i> .  |
| 4<br>(Male)                          | <i>"I think about using the active instruction method which is new in our country"</i> . Active instruction enables the act of teaching mathematics not in a concrete way but in an abstract way. This, in turn, makes mathematics to be comprehended in an easy way" .  |
| 5<br>(Female)                        | <i>"I want to eradicate the fear of the students. I help them in terms of coming before the blackboard and asking the things that they did not understand. I want to conduct active education as much as possible. I try to control the class in this way"</i> .   |
| 6<br>(Male)                          | <i>"I think that there is a correlation between class motivation and class control. The better a class is controlled the greater motivation is obtained"</i> .   |
| 7<br>(Female)                        | <i>"Firstly, we do not want to adopt that mathematics is a difficult lesson anymore. This has become a stereotyped assertion through being talked about by everyone. I believe that the first step of liking not only mathematics but also all the other lessons depends on the attitude of the teacher. The way to make easy a lesson that is regarded as difficult is to establish good relations with the students. Through active education subjects that we learned during our education we learned simple games that enable students prove themselves"</i> . |

examining from the easy one towards the difficult one and through using active learning techniques. Here it can be noteworthy that the candidate teachers find a close relation between ensuring motivation in the class and class control. This can be regarded as an indicator that the candidates think they would control the class through motivation factor only. In the fourth question the candidate teachers were asked, "Do you think there is a correlation between providing motivation in the class and class control or discipline in the class?". The answers given to this question are listed in the table below.

When the views of the candidate teachers are examined it appears that they touch upon the importance of affection and they intensely stress it is one of the basic factors in ensuring motivation. These findings conflict with the answers of the students they gave to the first question. Although the candidates did not include motivation in the effective factors in mathematics instruction they

stressed upon the importance of motivation in this question.

In the last question the students were asked, "At what level do you think you can ensure motivation? If you were to give scores for yourself what score would you give for yourself?" (The greatest score is 5). The answers are presented in the table below.

When the answers given to this question are examined it can be concluded that the candidates do not regard themselves sufficient enough regarding at what level they would ensure motivation in their classes. None of the candidates gave 5 out of 5 to themselves. Three students who were interviewed gave themselves four points regarding the subject and four candidates gave themselves three points out of five. This too can be interpreted in a way that the candidates need more information and skills regarding ensuring motivation in the class.

**Table 4.** Student teachers' responses on question four during interview.

| Teacher interviewed and their gender | Student teachers' responses   |
|--------------------------------------|---|
| 1<br>(Female)                        | <i>"In order to provide motivation, the teacher must attract attention towards himself/herself. I believe that love is the most crucial thing. If you make yourself and your lesson appreciated, the students will get pleasure from the lesson and there will be no problem in the class".</i>   |
| 2<br>(Female)                        | <i>"There is a correlation between class control and motivation. The important thing in providing motivation is to activate all the students. If all the students are motivated for the lesson, both the class control and the class discipline are achieved".</i>  |
| 3<br>(Female)                        | <i>"Motivation is to enable the class to give attention for the lesson. Class discipline is becoming important for the conditions and the ones who may spoil motivation".</i>   |
| 4<br>(Male)                          | <i>"There is a great correlation between motivation and class discipline. A student who cannot be motivated for the lesson starts to give harm to his/her friends. For example, through disturbing one of his friends who is motivated, he/she can spoil his/her motivation, too. This, in turn, causes disturbance of the class peace, that is lack of discipline".</i>          |
| 5<br>(Female)                        | <i>"Through providing motivation we already take the class under control. We have more fruitful and more satisfactory lessons".</i>   |
| 4<br>(Male)                          | <i>"The two are correlated. If the teacher is successful, then the motivation is automatically ensured".</i>  |
| 7<br>(Female)                        | <i>"I think, motivation and discipline are being separated in a sense. Because, when we talk about discipline, we can think about a tougher expression. However, motivation is thought to be student's grasping the subject. Ensuring motivation is important through using the two. This can be achieved in a moderate and supporting atmosphere not in a tough atmosphere".</i> |

**Table 5.** Student teachers' responses on question five during interview.

| Teacher Interviewed/ gender | Responses |
|-----------------------------|-----------|
| 1 (Female)                  | Four (4)  |
| 2 (Female)                  | Three (3) |
| 3 (Female)                  | Four (4)  |
| 4 (Male)                    | Three (3) |
| 5 (Female)                  | Three (3) |
| 6 (Male)                    | Four (4)  |
| 7 (Female)                  | Three (3) |

#### 4. CONCLUSION AND RECOMMENDATIONS

Under the light of all these findings, some recommendations presented were included in the study. Some of the general recommendations for ensuring motivation can be summarized. For instance, an affirmative atmosphere might be created in the classroom. Affirmation of the attitude in the

classroom is one of the prerequisites of success for the children who have negative feelings about the school due to the continuing failures. Activities, which will arouse their curiosity and direct them toward research in the environment of learning, might be performed. Some other general suggestions can be given as follows:

- Instruction experiences should be meaningful and meet the needs of the student.
- The best should be expected from the student. It is observed that students behave according to the expectations of their teacher. Expectations of the teacher are used in motivating the students. If you expect and demand the best from the student, you often attain what you expect.
- The teacher should teach with different techniques in accordance with his/her instruction experiences; should utilize several techniques and methods collectively in the same lesson.

- The teacher should keep communication channels open in the class, in order to draw attention and interest of the students.
- Students may be given chance to choose their assignments in the subjects they are interested in, fond of and want to learn.
- Feedback should be given in time. Give student the chance to be aware of how much she /he has improved himself.
- Meaningful learning experiences should be created.
- Efforts of the students should be rewarded and they should be encouraged to spend effort.
- Anxiety should be reduced. For this purpose, learning activities may be made enjoyable for the students. The activities should be planned so that they can be achieved and in line with their abilities.

In addition to all these under the light of the findings of this study, it can be said that motivation is an important factor in effective teaching and learning of mathematics as the case with all the lessons. Therefore, candidate teachers can be made acquire some information and skills of some strategies regarding how they would ensure motivation in the class while teaching mathematics.

The candidates who acquire these information and skills in teacher training programs will face less trouble through this dimension in actual school atmosphere and they will be able to feel themselves adequate in teaching mathematics more effectively through using these skills as well as ensuring motivation and making use of other factors.

## REFERENCES

- Capel, S.; Leask, M. & Tuncer, T. (1995). *Learning to teaching the secondary school*, London: Routledge.
- Çakmak, M. (1999). Novice and experienced teachers' strategies for mathematics teaching in English and Turkish primary classrooms. Unpublished Doctoral Thesis, England.
- Çakmak, M. (2001a). The role of experience and expertise in Teaching Context. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, Sayı:21, s:159-165.
- Çakmak, M. (2001b). Etkili öğretimde öğretmenin rolü. *Çağdaş Eğitim Dergisi* Yıl:26, Sayı:274, S.22-28.
- Ercan, L. (2001). Motivasyon. *Sınıf yönetiminde yeni yaklaşımlar*, (Ed: L.Küçükahmet), Ankara: Nobel Yayınları.
- Entwistle, N. (1987). Motivation to learn: conceptualization and practicalities. *British Journal of Educational Studies*, Vol.XXXV., No:2, pp.129-148.
- Kyriacou, C. (1995) *Essential teaching skills*. Cheltenham: Stanley Thornes.
- Petty, G. (1993) *Teaching today (a practical guide)*, Cheltenham stanley thornes limited.