

Self-efficacy beliefs of students of primary school teaching department regarding mathematics and teaching mathematics

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ABSTRACT

Prospective teachers' attitudes and beliefs regarding self-efficacy beliefs become the basis of their attitudes in their professional lives, as they affect their students' attitudes and self-efficacy. The aim of this study is to determine the primary teacher training students' attitudes towards mathematics and self-efficacy beliefs regarding teaching math and the relationship among them. The "Relational Scanning Model" is used in the study. Data is collected from 290 students who were studying in the Primary Education Department of 9 Eylül University, Buca Faculty of Education. Mathematics Attitude Scale and Self-efficacy Belief Scale towards Teaching Mathematics are used to gather data. SPSS 22 was used for data analyses. T-test used for identifying significance of differences, and the Pearson correlation coefficient by means of different aspects. Results showed no differences by gender in attitudes towards math and self-efficacy beliefs regarding teaching math of the students who completed the survey. However, although Primary Education prospective teachers scores were higher in their attitude points and self-efficacy towards math teaching, a significant difference between pre-school and primary school prospective teachers. Besides, results revealed a relationship between attitude and self-efficacy beliefs regarding math. To further research, it is recommended that the same surveys should be done with different groups and the larger sample sizes.

Keywords: Attitude towards math, self-efficacy beliefs, prospective teachers.

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INTRODUCTION

When examining the discussions related to education these days, it is clear that one of the most discussed problems is the education of teachers and the teachers' attributes. Besides, the most important topics at the level the teachers' attitude and their self-efficacy beliefs regard teaching. The education of primary school teachers is done in education faculties in Turkey. A 4-years education program, which includes pre-school education and primary education is applied to prospective teachers (Başkan et al., 2006). This program includes the professional instruction lessons, which include the required knowledge and skills for effectively and efficiently being able to understand, change, and learn by critically analyzing the teacher's teaching environment, the institution, and the lessons that the teacher will teach

(Coşkun and Sezen-Yüksel, 2018). There are common lessons in sciences on specific lessons regarding different subjects, including math (YÖK, 2018).

Mathematics is the stepping-stone to science and technology. Altun (2002) describes mathematics as a mental activity, which is developed through the pursuit of understanding the truth. This mental activity, which involves abstraction, analysis, and application, is a spiral cycle. Each activity once completed brings forth a new outlook, and this outlook also has a new mode of analysis (Sevgen, 2002). Consequently, mathematics has been applied in every area of life. Thus, mathematics is widely applied as it affects the ways education is delivered in mathematics education area (Çoban, 2002). It is important that math educators are those who are able to

improve self-efficacy, foster a positive attitude towards math, adapt to knowledge and technology of the age, work with others in cooperation, improve new strategies to solve problems can describe the problems in their own lives (MEB, 2018).

An attitude is "a relatively enduring organization of beliefs, feelings, and behavioral tendencies towards socially significant objects, groups, events or symbols" (Hogg and Vaughan 2005, cited in McLeod, 2018).

The person's manner that he/she puts forth as mental, emotion, and behavior about an object, a position, or a person reflects the person's attitude (Inceoğlu, 2004). Zan and Di Martino (2007) emphasized that the attitude towards math is based on the beliefs, feelings, and behaviors that shape the positive or negative tendencies.

The feelings and behaviors related to math that primary school prospective teachers' also affect their self-efficacy beliefs (Aksu, 2008). To Bandura (1997), self-efficacy is a trait that affects forming of behaviors, and it has been described as the outlook related to oneself regarding the capacity for successful application, by organizing the required behaviors to show a specific performance. To Aston (cited in Ekici, 2008), teacher self-efficacy belief is the teachers' capacities regarding orienting the students' performances or their beliefs about doing their tasks successfully.

Teaching self-efficacy beliefs often related with positive teaching behaviors, classroom management, and active learning environments etc. It is revealed that there is a relationship between teacher self-efficacy and students' achievements (Siegle, 2003).

Teacher self-efficacy belief is a significant variable in increasing the quality of education, in classroom management, in increasing student achievement, in the use of method and strategy and in increasing student motivation and success (Woolfolk et al., 1990; Al-Alwan and Mahasneh, 2014; Tschannen-Moran and Hoy, 2007).

Research has shown that enjoyment of mathematics can lead to higher perceived ability to do math (Pinxten et al., 2014). Briley (2012) in his study revealed that beliefs and feelings toward mathematics had a significant effect on teachers' self-efficacy for teaching mathematics. If a higher enjoyment of mathematics could lead to higher self-efficacy for teaching mathematics, then it becomes important for math methods courses to not only teach the theoretical practices for teaching math, but to also help foster positive attitudes towards math (McGuire, 2016).

LITERATURE REVIEW

Recent study have been done on the attitudes towards math and examined the primary school, high school, and university students' attitudes towards math based on different variables (gender, school type, class level, parents' education level, success, etc.). Özlü (2001) explores secondary school students' attitude towards

math and its relationship with the different variables. Alcı (2001) intended to elucidate how grade-4 teachers' math attitude affected the students' successes. Peker and Mirasyedioğlu (2003) studied senior students in high schools to define the students' attitude to their successes on math and the relationship between their attitude points and success. Alkan et al. (2004) attempts to determine the factors that influence the attitudes of high school students' attitude towards math depend on and how the students are affected by their teacher's behaviors. Bayturan (2004) studied secondary school students to identify if the students' successes in math and relationship between their attitudes towards math and psychosocial and social-demographic properties. Akdemir (2006) studied primary school students' attitude towards math and their success motivation, and Yenilmez (2007) examined primary school students' attitude toward math. Ekizoğlu and Tezer (2007) examined the relationship between the primary school students' attitude towards math and their math success points. Taşdemir and Taşdemir (2008) performed a survey to define grades 6–8 students' attitude towards math in relation to some variables. Göç (2010) examined primary school students' attitude towards math, their success motivations by gender, their parents' education level, and class levels, and what kind of relationship their success motivations show with their gender, class level, and their parents' education level. Yağmur (2012) researched the relationship between the students' attitude towards math and their self-efficacy in teacher high schools. Elkonca (2013) examined secondary school students' attitude towards math with chaid analysis. Yaşar et al. (2014) made a survey on the attitudes towards math of high school students in Turkey and the factors that affect these attitudes. Tuncer and Yılmaz (2016) studied the evaluation of secondary school students' attitudes and anxieties regarding math. The surveys regarding prospective teachers include the following: Doğan (2000) with the students in Educational Faculties; Kızıloğlu and İpek (2001) and Başer and Yavuz (2003) with prospective teachers; Duru et al. (2005), Kandemir (2007) with prospective primary teachers; Çelik and Bindak (2005) with the students in primary education departments, Tarım and Bulut (2007) with prospective pre-school teachers; Gökçek and Güneş (2011) and Göloğlu Demir (2011) with primary school math teachers; and Tabuk and Tabuk (2018) with prospective teachers. These studies had been done examining the prospective teachers' attitudes about different variables. Apart from all these studies, there have been a lot of surveys on students' attitudes towards math that affect their success (Minato and Yanese, 1984; Ethington and Wolfle, 1986; Cheung, 1988; Ma and Kishor, 1997; Tapia and Marsh, 2000; Yee, 2010; Baydar, 2000; Ekici, 2008; Duatepe-Paksu, 2008, and Özsoy-Güneş et al., 2015) studied on the teachers' and prospective teachers' self-efficacy beliefs in teaching math and their professions. Based on

this literature, the aim of our survey is to determine primary school prospective teachers' attitudes towards math, their self-efficacy beliefs, and the relationship between them.

In this frame the survey presented the following questions for prospective teachers attending the primary school teaching department:

1. How are their attitudes towards math and their self-efficacy beliefs related to teaching math?
2. Is there any difference in attitudes towards math with regards to gender and the department in which they were educated?
3. Is there any difference in their self-efficacy beliefs with regards to gender and the department in which they were educated?
4. Is there any relationship between attitudes towards math and self-efficacy beliefs towards teaching math?

METHODOLOGY

The research was designed in accordance with the correlational survey methods. Relational scanning is one of the research models that aim to define the degree of correlation through time among two or more variables (Cohen et al., 2008; Karasar, 2009).

Study group

The study group consists of 321 4th grade primary school prospective teachers who took lessons in Dokuz Eylül University, Buca Faculty of Education in İzmir, Turkey. 270 of the participants were female and 51 of them are male. The participation to the study was on a voluntary basis.

Data collection instruments

In order to determine the teacher candidates' attitudes towards math, 'The Math Attitude Scale' was used. The scale was developed by Duatepe and Çilesiz (1999).

The "Math Attitude Scale" which was developed by Duatepe and Çilesiz (1999) was used for determining teacher candidates' attitudes towards math. The scale is based on four subscales (interest/ like; afraid/confidence; profession/ importance; pleasure) and 38 items using a 5-point, Likert-type scale. The first dimension of the scale included the items that measure "interest and like" (13 items); the second dimension included "afraid-confidence" (9 items); the third dimension included "Profession and importance" (8 items); the fourth dimension included "pleasure" (8 items). In order to get the reliability estimates of the scale, Cronbach's alpha measure was used and the total scale is obtained as

0.96.

The self-efficacy beliefs towards mathematics teaching scale was developed by Aksu (2008) five point likert type scale with 24 items. The scale consisted from two subscales as Self efficacy and Coping Behavior. In order to get the reliability estimates of the scale, Cronbach's alpha measure was used and the total scale is obtained as 0.89.

Data analysis

The descriptive statistics of the variables and correlation analysis were conducted through SPSS 22. During the data analysis process, firstly the Kolmogorov Smirnov test was conducted in order to determine whether or not the data showed normal distribution. According to the results; the scores of primary teacher candidates (Sig. = .08, $p > .05$) were above $p > .05$, which indicates a normal distribution. Tabachnick and Fidell (2013) underline that if the skewness and kurtosis values of these values are between +1.5 and -1.5, an analysis is considered to be made according to the normal distribution. Skewness and kurtosis values of the mean scores obtained from the scales used in this study were found to be within the specified ranges (Skewness = -.757, -.126; Kurtosis = 1.068, -.537). Then, in order to determine the relationship between attitudes towards mathematics and self-efficacy beliefs towards mathematics teaching, correlation analysis was used. And the parametric independent samples t-test was conducted in analyzing the data in order to compare with independent variables such as gender, department.

RESULTS

RQ1: The findings are displayed below as sub problems. The first sub problem of the study was "How are the prospective teachers' attitude towards math and their self-efficacy beliefs towards teaching math?" The mean and standard deviation values of the scores that the participants gave for the attitude scale are displayed on Table 1.

The mean of the prospective teachers' answers are ordered as follows: between 1.00 and 1.79 "I never agree," 1.80–2.59 "I don't agree," 2.60–3.39 "I have no idea," 3.40–4.19 "I partly agree," and 4.20–5.00 "I completely agree." Considering these degrees, the mean of the students' attitude levels towards math are "I partly agree" with 3.63; prospective teachers have willingly been studying math, spending time, and are interested in Math.

The mean and standard deviation values for the self-efficacy belief scale are displayed on Table 2. While the averages of prospective teachers' answers were

Table 1. Prospective teachers' attitude level towards mathematics.

Scale	Mean	SS
Mathematic attitude level	3.63	1.34

Table 2. Prospective teachers' self-efficacy beliefs towards mathematics

Scale	O	SS
Self-efficacy belief	3.84	3.24
Coping behavior	3.65	1.47
Total	3.79	4.02

evaluated, they were ordered as follows: Between 1.00 and 1.79 "I never agree," 1.80–2.59 "I don't agree," 2.60–3.39 "I have no idea," 3.40–4.19 "I partly agree," and 4.20–5.00 "I completely agree." Considering these degrees, the students' self-efficacy belief levels towards math are "I agree" in all sub dimensions and in total. We can thus say that prospective teachers have high self-efficacy beliefs towards teaching mathematics.

RQ 2: Is there any difference in their attitudes towards math with regards to gender and the department in which they were educated?

As the data distributed normally t-test for independent samples has been applied for examining the concerned difference (Table 3).

Although the female prospective teachers' attitude scores are higher than male, this difference is not statistically significant ($t(288) = 0.88; p > .05$).

The t-test results show that the difference amongst

prospective teachers' means according to department which they have been educated is significant [$t(288) = 2.93, p < 0.05$] (Table 4). Result show that primary education prospective teachers' attitudes towards math are higher than pre-school prospective teachers'.

RQ 3: Is there any difference in their self-efficacy beliefs with regard to gender and the department in which they were educated?

Results of the t-test analysis concerning teacher candidates' self-efficacy levels with regards to gender are given on Table 5.

Table 5 shows the evaluation of the self-efficacy belief dimension. Male prospective teachers' mean is higher than females'. Regarding achievement behavior and total evaluation, females' averages are higher than males. It is evident on Table 5 that there are no significant difference amongst prospective teachers with regards to gender in both sub scales and total scores of self-efficacy belief scale.

Table 6 shows that primary school prospective teachers' scores are higher than pre-school prospective teachers' in self-efficacy beliefs, coping behavior, and total evaluations. But, there is no significant difference is shown in the result of the t-test ($t(288) = 0.94, p > 0.05$).

RQ 4: Is there any relationship between attitudes and self-efficacy beliefs towards teaching math?

In order to find the answer to this sub problem, the correlation between prospective teachers' math attitude and self-efficacy beliefs regarding teaching math are examined.

Table 7 shows a statistically significant positive relationship ($p < 0.05$) at moderate level ($r = 0.328$) between the points from the mathematics attitude scale and self-efficacy scale ($r = 0.328; p < 0.05$).

Table 3. T-test results of prospective teachers' attitudes towards mathematics by gender.

Gender	n	Mean	SD	Df	t	p
Female	255	3.35	0.98	288	0.88	0.658
Male	35	3.11	1.00			

Table 4. T-test Results of prospective teachers' attitudes regarding their department

Department	N	Mean	SD	Df	t	p
Pre-school	203	2.02	1.11	288	2.93	0.028*
Primary education	87	3.57	1.68			

Table 5. T-test results of prospective teachers' self-efficacy beliefs by gender.

Dimensions	Gender	N	Mean	SD	df	t	p
Self-efficacy belief	Female	255	3.25	0.43	288	0.33	0.531
	Male	35	3.32	0.94			

Table 5. Continues.

Coping behavior	Female	255	3.68	0.34	288	0.88	0.378
	Male	35	3.59	0.39			
Total	Female	255	3.63	0.84	288	0.78	0.618
	Male	35	3.57	0.92			

Table 6. T-test Results of Teachers' self-efficacy beliefs according to department.

Dimensions	Department	n	Mean	SD	DF	t	p
Self-efficacy belief	Pre-school	203	3.28	1.08	288	0.37	0.494
	Primary school	87	3.36	0.88			
Coping behavior	Pre-school	203	2.99	1.21	288	0.79	0.395
	Primary school	87	3.18	0.89			
Total	Pre-school	203	3.01	2.94	288	0.94	0.755
	Primary school	87	3.34	1.97			

Table 7. Pearson correlation analysis results for the mathematics attitude scale and self-efficacy scale.

Variable	n	r	p
Self-efficacy towards teaching math	290	0.328	0.042*

DISCUSSION

According to data, primary teacher candidates' attitudes towards math are positive and self-efficacy beliefs are high. Although, female prospective teachers' attitude levels towards math were higher than males, there was no significant difference. Findings showed that gender had no effect on attitude towards math in many surveys done before (Abalı Öztürk and Şahin, 2015; Sezen and Yanık, 2012; Ursini and Sanchez, 2008; Sırmacı, 2007). Besides, Tabuk and Tabuk (2018) observed that male prospective teachers' attitude points for both math and teaching math were higher than women's. It was found that prospective teachers' attitude levels had a difference due to the departments of the primary school teachers. This result aligns with that of Sırmacı's study (2017). Besides, primary school teachers' attitude points were higher than pre-school teachers' in the survey by Tabuk and Tabuk (2018). This demonstrated that prospective teachers' self-efficacy beliefs were similar by gender. Similarly, it can be seen that there is no significant difference in the self-efficacy beliefs of candidate maths teachers according to their gender on the results of the research conducted by Şallı (2012) and Hacıömeroğlu and Taşkın (2010) Aksu (2008), Duatepe-Paksu (2008) and Baydar (2000).

When the departments of the candidate teachers,

which they attend considered, it can be concluded that the teachers' self-efficacy beliefs towards maths showed no significant difference.

This result is similar with findings in related surveys (Aksu, 2018; Duatepe-Paksu, 2008).

RECOMMENDATIONS

In this study group, prospective primary teachers revealed limited data as the result of the study.

Further studies can be carried out by the prospective teachers of different universities and more data can be collected considering the limitations in the current study. These further studies may lead to the comparison of the results to get more accuracy.

In this study self-report instruments were used. Different research techniques can be used to triangulation for instance interviews, observations etc. can be benefited.

REFERENCES

- Abalı Öztürk, Y., and Şahin, Ç. (2015). Matematiğe İlişkin Akademik Başarı – Özyeterlilik ve Tutum Arasındaki İlişkilerin Belirlenmesi. *The Journal of Academic Social Sciences Studies*, 31: 343-366.
- Akdemir, Ö. (2006). İlköğretim Öğrencilerinin Matematik Dersine Yönelik Tutumları Ve Başarı Güdüsü. *Yayımlanmamış Yüksek Lisans*

- Tezi. Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü. İzmir.
- Aksu, H. H. (2008).** Öğretmen Adaylarının Matematik Öğretimine Yönelik Öz-yeterlilik İnançları. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 8(2): 161-170.
- Al-Alwan, A. F., and Mahasneh, A. M. (2014).** Teachers' self-efficacy as determinant of students' attitudes toward school: A study at the school level. Review of European Studies; Vol. 6, No.1.
- Alcı, B. (2001).** İlköğretim dördüncü sınıf öğretmenlerinin matematiğe karşı tutumlarının öğrencilerin matematik başarısı üzerindeki etkisi, Yayınlanmamış Yüksek Lisans Tezi. Atatürk Üniversitesi Eğitim Bilimleri Enstitüsü. Erzurum.
- Alkan, H., Bukova Güzel, E., and Elçi, A. N. (2004).** Öğrencilerin Matematiğe Yönelik Tutumlarında Matematik Öğretmenlerinin Üstlendiği Roller Belirlenmesi, XIII. Ulusal Eğitim Bilimleri Kurultayı, 6-9 Temmuz 2004 İnönü Üniversitesi, Eğitim Fakültesi, Malatya.
- Altun, M. (2002).** Matematik Öğretimi. (2. Baskı) İstanbul: Alfa Yayınları.
- Bandura, A. (1997).** Self-Efficacy: The Exercise of Control. New York: Freeman.
- Başer, N., and Yavuz, G. (2003).** Öğretmen Adaylarının Matematik Dersine Yönelik Tutumları. Matematikçiler Derneği.
- Başkan, A. G., Aydın, A., and Madden T. (2006).** Türkiye'deki Öğretmen Yetiştirme Sistemine Karşılaştırmalı Bakış, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 15(1): 35-42.
- Baydar, C. S. (2000).** Beliefs of Prospective Mathematics Teachers at the Middle East Technical University and Gazi University About the Nature of Mathematics and The Teaching of Mathematics. Unpublished master's thesis. Middle East Technical University, Ankara.
- Bayturan, S. (2004).** İlköğretim ikinci kademe öğrencilerinin matematik başarılarının matematiğe yönelik tutum, psikososyal ve sosyodemografik özellikleriyle ilişkisi. Yüksek lisans tezi, Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir.
- Briley, J. S. (2012).** The relationships among mathematics teaching efficacy, mathematics self-efficacy, and mathematical beliefs for elementary pre-service teachers, IUMPST: The Journal. Vol 5 (Teacher Attributes), August.
- Bulut, M. (2007).** Curriculum reform in Turkey: A case of primary school mathematics curriculum. Eurasia Journal of Mathematics, Science and Technology Education, 3(3): 203-212.
- Cheung, K. C. (1988).** Outcomes of schooling: Mathematics achievement and attitudes towards mathematics learning in Hong Kong. Educational Studies in Mathematics, 19: 209-219.
- Cohen, L., Manion, L., and Morrison, K. (2008).** Research methods in education. N.Y: Routledge, Taylor & Francis Group.
- Coşkun, M., and Sezen-Yüksel, N. (2018).** Determination of reasons of failure of prospective mathematics teachers in undergraduate courses: Topology course case. Inonu University Journal of the Faculty of Education, 19(3): 216-230.
- Çelik, H. C., and Bindak, R. (2005).** Sınıf Öğretmenliği Bölümü Öğrencilerinin Matematiğe Yönelik Tutumlarının Çeşitli Değişkenlere Göre İncelenmesi, Kastamonu Eğitim Dergisi, 13(2): 427-436.
- Çoban, A. (2002).** Matematik dersinin ilköğretim programları ve liselere giriş sınavları açısından değerlendirilmesi. V. Ulusal Fen Bilimleri ve Matematik Eğitimi Kongresi Bildiri Kitabı.
- Di Martino, P. (2007).** Attitude toward mathematics: overcoming the positive/negative dichotomy. Monograph, 3: 157-16.
- Doğan, M. (2000).** Eğitim fakültelerinde okuyan aday öğretmenlerin matematiğe karşı tutumları. IV. Fen Bilimleri Eğitim Kongresi'nde sunulan bildiri, Hacettepe Üniversitesi, Ankara, 6-8 Eylül.
- Duatepe, A., and Çilesiz, Ş. (1999).** Matematik Tutum Ölçeği Geliştirilmesi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 16-17, 45-52.
- Duatepe-Paksu, A. (2008).** Comparing teachers' beliefs about mathematics in terms of their branches and gender. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 35: 87-97.
- Duru, A., Akgün, L., and Özdemir, M. E. (2005).** İlköğretim öğretmen adaylarının matematiğe yönelik tutumlarının incelenmesi. Kazım Karabekir Eğitim Fakültesi Dergisi, 11: 520-536.
- Ekici, G. (2008).** Sınıf Yönetimi Dersinin Öğretmen Adaylarının Öğretmen Öz-yeterlilik Algı Düzeyine Etkisi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 35: 98-110.
- Ekizoğlu, N., and Tezer, M. (2007).** İlköğretim öğrencilerinin matematik dersine karşı tutumları ile matematik başarı puanları arasındaki ilişki. Kıbrıslı Eğitim Bilimleri Dergisi, 3: 43-57.
- Elkonca, F. (2013).** Ortaokul Öğrencilerinin Matematiğe Yönelik Tutumlarının Chaid Analizi ile İncelenmesi. (Yayınlanmış Yüksek Lisans Tezi), Yüzüncü Yıl Üniversitesi Eğitim Bilimleri Enstitüsü.
- Ethington, C. A., and Wolfe, L. M. (1986).** A structural model of mathematics achievement for men and women. American Educational Research Journal, 23: 50-75.
- Göç, T. (2010).** İlköğretim öğrencilerinin matematik dersine yönelik tutumları ve başarı güdüsü düzeyleri (Yüksek Lisans Tezi). Dokuz Eylül Üniversitesi, Eğitim Bilimleri Enstitüsü, İzmir.
- Gökçek, T., and Güneş, G. (2011).** Öğretmen adaylarının temel matematik kavramlarını öğrenme düzeyleri ile matematik dersine yönelik tutumlarının belirlenmesi. Kastamonu Eğitim Dergisi, 19(3): 849-858.
- Göloğlu Demir, C. (2011).** İlköğretim matematik öğretmenliği programında öğrenim gören öğrencilerin matematik öğretimine yönelik öz-yeterlilik inançları ve tutumlarının incelenmesi. (Yayınlanmamış yüksek lisans tezi). Gazi Üniversitesi / Eğitim Bilimleri Enstitüsü, Ankara.
- İnceoğlu, M. (2004).** Tutum Algı İletişim, Kesit Tanıtım Ltd. Şti., Ankara.
- Kandemir, M. (2007).** Sınıf öğretmeni adaylarının temel matematik dersine ilişkin tutumları ve kavram öğrenim düzeyleri. Erzincan Eğitim Fakültesi Dergisi, 9(2): 13-32.
- Karasar, N. (2009).** Bilimsel Araştırma Yöntemi (19. baskı). Ankara: Nobel Yayın Dağıtım.
- Kızıloğlu, F. N., and İpek, A. S. (2001).** Öğretmen adaylarının matematiğe karşı tutumlarının bazı değişkenler açısından incelenmesi. Gazi Üniversitesi Kastamonu Eğitim Dergisi, 9(2): 379-386.
- Ma, X., and Kishor, N. (1997).** Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis. Journal for Research in Mathematics Education, 28(1): 27-47.
- McLeod, S. A. (2018).** Attitudes and behavior. Simply Psychology. <https://www.simplypsychology.org/attitudes.html>.
- MEB (2018).** İlkokul Matematik Eğitim Programı, Ankara.
- Minato, S., and Yanase, S. (1984).** On the relationship between students' attitudes toward school mathematics and their levels of intelligence. Educational Studies in Mathematics, 15: 313-320.
- Özlü, Ö. (2001).** Ortaöğretim öğrencilerinin matematiğe karşı tutumları (Yüksek Lisans Tezi). Marmara Üniversitesi, Fen Bilimleri Enstitüsü, İzmir.
- Özsoy-Güneş, Z., İnce, E., and Kırbaşlar, F. G., (2015).** Sınıf öğretmeni adaylarının matematik öz-yeterlilik algıları ve kimya problemlerinde matematik kullanımına yönelik görüşleri. Kafkas Eğitim Araştırmaları Dergisi, 2(2): 23-32.
- Pinxten, M., Marsh, H. W., De Fraine, B., Van Den Noortgate, W., and Van Damme, J. (2014).** Enjoying mathematics or feeling competent in mathematics? Reciprocal effects on mathematics achievement and perceived math effort expenditure. British Journal of Educational Psychology, 84: 152-174.
- Sevgen, B. (2002).** Matematiksel Düşünce Yapısı ve Gelişimi, V. Ulusal Fen Bilimleri ve Matematik Eğitimi kongresi, 16-18-Eylül-2002, Ortadoğu Teknik Üniversitesi, Ankara.
- Sezen, N., and Yanık, C. (2012).** Biyoloji Öğretmen Adaylarının Matematiğe Yönelik Tutumları: Öğretim Programında Matematik Dersi Olmalı mı? Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 43: 410-421.
- Sırmacı, N. (2007).** Üniversite Öğrencilerinin Matematiğe Karşı Kaygı ve Tutumlarının İncelenmesi: Erzurum Örnekleme. Eğitim ve Bilim, 32(145): 53-70.
- Siegle, D. (2003).** Influencing student mathematics self-efficacy through teacher training. Paper presented at the annual meeting of the American Research Association, Chicago, IL.
- Tabachnick, B. G., and Fidell, L. S. (2013).** Using multivariate statistics (6th ed.), Boston: Allyn and Bacon.
- Tabuk, M., and Tabuk, M. (2018).** Öğretmen adaylarının matematiğe ve matematik öğretimine ilişkin tutumları. Anadolu Üniversitesi Eğitim Fakültesi Dergisi (AUJEF), 2(1): 52-66.
- Tapia, M., and Marsh, G. E. (2000).** Effect of gender, achievement in

- mathematics and ethnicity on attitudes toward mathematics. Annual Meeting of the Mid- South Educational Research Association, Bowling Green, KY, USA.
- Taşdemir, M., and Taşdemir, A. (2008).** Comparison of Turkish primary school students' achievement in science and maths subjects, *Journal of Qafqaz University*, 22: 190-198.
- Tschannen-Moran, M., and Hoy, A. W. (2007).** Teaching and teacher education, Elsevier.
- Tuncer, M., and Yılmaz, Ö. (2016).** Ortaokul öğrencilerinin matematik dersine yönelik tutum ve kaygılarına ilişkin görüşlerinin değerlendirilmesi, *KSÜ Sosyal Bilimler Dergisi Cilt:13 Sayı:2*.
- Ursini, S., and Sanchez, G. (2008).** Gender, technology and attitude towards mathematics: A comparative longitudinal study with Mexican students. *ZDM*, 40: 559–577.
- Woolfolk, A. E., Rosoff, B., and Hoy, W. K. (1990).** Teaching and teacher Education. Elsevier.
- Yağmur, A. (2012).** Anadolu öğretmen liselerinde öğrenim gören öğrencilerin matematik dersine yönelik tutumları ile özyeterlilikleri arasındaki ilişki (Yayınlanmamış yüksek lisans tezi). Ahi Evran Üniversitesi, Kırşehir.
- Yaşar, M., Çermik, H., and Güner, N. (2014).** High school students' attitudes towards mathematics and factors affect their attitudes in Turkey. *Ankara University Journal of Faculty of Educational Sciences*, 47(2): 41-64.
- Yee, L. S. (2010).** Mathematics attitudes and achievement of junior college students in Singapore. Shaping the future of mathematics education: Proceedings of the 33rd annual conference of the Mathematics Education Research Group of Australasia. Fremantle: MERGA.
- Yenilmez, K. (2007).** Attitudes of Turkish high school students toward mathematics. *International Journal of Educational Reform*, 16(4): 318–335.
- Yüksek Öğretim Kurumu (YÖK) (2018).** Öğretmen Yetiştirme Lisans Programları-Ankara
- Zan, R., and Di Martino, P. (2007).** Attitude toward mathematics: Overcoming the positive/negative dichotomy. *The Montana Mathematics Enthusiast*, 3: 157- 168.

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