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Investigation of Mathematics Teachers' Self-Efficacy in Teaching Mathematics in the COVID-19 Pandemic Process

Mithat TAKUNYACI[1]

[1] Sakarya University, Faculty of Education, Department of Mathematics Education, Turkey,

Correspondence: Mithat TAKUNYACI, Sakarya University, Faculty of Education, Department of Mathematics Education, Sakarya, 54300, Turkey. Tel: -. E-mail: mtakunyaci@sakarya.edu.tr

Abstract
Teachers' beliefs about teaching mathematics have a great influence on students' success in mathematics. In addition, teachers with high teaching efficacy beliefs create classroom environments where students can be more successful. In the light of this information, the importance of understanding mathematics teachers' beliefs about their competence has to be considered in mathematics teaching. In this study, a relational survey model was used to examine secondary mathematics teachers' efficacy beliefs about teaching mathematics in terms of some variables. The sample of the study consists of 165 mathematics teachers selected with the stratified sampling method. In this study, Mathematics Teaching Efficacy Belief Scale, developed by Enochs, Smith, and Huinker (2000) and adapted to Turkish by Takunyacı and Aydın (2013) was used. The first finding of our study is mathematics teachers' beliefs about mathematics teaching were medium level. The second finding of our study is the personal mathematics teaching efficacy beliefs of male teachers were significantly higher than female teachers, while female teachers' efficacy beliefs about outcome expectations in mathematics teaching were significantly higher than male teachers. The third finding of our study is efficacy beliefs of mathematics teachers working in private high schools about the outcome expectation in mathematics teaching were significantly higher than the mathematics teachers working in public high schools. In the last finding of our study, it was found that the personal mathematics teaching efficacy beliefs of mathematics teachers with professional seniority of 11 years or more were significantly higher than teachers with professional seniority of 0-5 years.

Keywords: Self-Efficacy, Teacher Efficacy, Teaching Efficacy, Efficacy Belief

1. Introduction

Self-efficacy is a person's belief in the ability to perform a certain task or to perform a certain action (Bandura, 1977). The level of competence for a particular task or action determines whether a person will perform the task or action, and the amount of effort spent to overcome the task or any challenge (Bandura, 1977; Hackett & Betz, 1989). Self-efficacy is not static, and an individual's level of competence may also change depending on new experiences or actions (Bandura, 1986; Pajares, 1996; Pajares & Miller, 1994). Self-efficacy beliefs also affect individuals' emotions and cognitive processes when doing a task. For example, people with low self-efficacy for

a particular task may believe that the task is more difficult than it actually is. Such beliefs will feed stress, fear, and disrupt the cognitive process of the person in finding a solution rearding the task.

Bandura (1977) grouped self-efficacy under two headings as outcome expectation and efficacy expectation. Outcome expectation is a person's assessment of what behavior is necessary to achieve the desired outcome. An Efficacy expectation is a belief that the behavior required to achieve the desired result can be applied. Outcome expectancy, individuals can determine the course of action required to produce the desired outcome (Bandura 1986; Guskey & Passaro, 1994; Hackett & Betz, 1989; Zimmerman, 2000). However, if individuals do not believe that they can perform the action, knowing the course of the action does not affect their behavior towards the action. Expectations of efficacy will determine the person's behavior towards performing the action, the amount of effort and even the time spent to realize the flow of the action (Bandura, 1986; Maddux, Norton, & Stoltenber, 1986; Pajares, 1996; Pajares & Miller, 1994; Schunk, 1991; Zimmerman, 2000). Self-efficacy beliefs can be modified or reinforced by performance achievements, indirect experiences (seeing a peer or adult complete a task successfully), verbal persuasion (encouraged by peers and adults), and physiological states (excited about the task) (Bandura 1977, 1986; Zimmerman, 2000). The adverse effect may prevail if the student fails repeatedly, sees unsuccessful models on the task, does not receive positive feedback, or is discouraged, or experiences stress or fear as part of the task.

Studies on self-efficacy beliefs especially teacher efficacy (Ashton & Webb, 1986; Bandura, 1986; Guskey & Passaro, 1994), mathematics self-efficacy (Hackett & Betz, 1989; Pajares, 1996; Pajares & Miller, 1994; Kranzler and Pajares, 1997), and mathematics teaching proficiency (Bates, Kim, & Latham, 2011; Enochs, Smith, & Huinker, 2000; Swars, 2005) have gained a lot of attention in the field of education in recent years.

Existing research point out many factors including students' achievement in mathematics, socio-economic status, and attitude towards mathematics (Keith & Cool, 1992; Secada, 1992). Mathematical beliefs (Schoenfeld, 1985), teacher self-efficacy (Bandura, 1993; Gibson & Dembo, 1984; Knapp, Copland & Talbert, 2003), and teacher math competence (Ball, 1990; Charalambous, Philippou, & Kyriades, 2008; Hill, Rowan and Ball, 2005; Glidden, 2008), which are also defined as having an impact on student performance. Among all the factors involved in student achievement, high-quality teacher training and teaching efficacy, which is defined as the teacher's self-esteem towards the subject taught, are defined as potential reasons for increasing student success (Knapp, Copland, & Talbert, 2003). In addition, teacher self-efficacy affects teachers' behavior in the classroom, the classroom environment, teaching techniques, and thus the success of their students (Bandura, 1993; Ross, 1994; Pajares, 1996).
Teacher competence has been studied extensively since the early 1970s and has been expressed as the degree of belief that the teacher's effort will have a positive effect on student learning and success. Bandura (1977) defined teacher efficacy as a belief in a particular type of self-efficacy or in teachers' capacity to perform at a certain level (low or high). The indicator of teacher efficacy can be explained by the teaching methods and strategies teachers prefer for effective teaching (Gibson & Dembo, 1984; Ross, 1994). The efficacy level of the teacher determines the amount of effort made, the duration of encountering obstacles, the level of resilience in coping with failures, and the level of stress or depression teachers experience when faced with difficult situations (Bandura, 1977; Ashton & Webb, 1986). Teachers who have a low sense of teaching efficacy or a low sense of personal teaching efficacy strive to look for the reasons for their students' failure, low motivation and attitudes (Gibson & Dembo, 1984). Teachers with a high sense of teaching efficacy have firm beliefs that they can take personal responsibility for student learning in reaching students who have difficulties in learning (Bandura, 1997; Gibson & Dembo, 1984; Ashton & Webb, 1986).

Teacher self-efficacy consists of personal teaching efficacy and teacher outcome efficacy (Allinder, 1995; Swars, 2005). Personal teaching efficacy is a teacher's belief in their ability and ability to positively affect student achievement, while teacher outcome efficacy is a teacher's belief that the education system can produce results for all students regardless of external influences as socio-economic status, family life, motivation or other personal circumstances that may be influential (Swackhamer, Koellner, Basile, & Kimbrough, 2009; Swars, 2005).

Teaching efficacy belief is a motivational concept that defines the beliefs a person has about their ability to accomplish a specific task (Bandura, 1977; Bong & Skaalvik, 2003). Social cognitive theory states that self-efficacy beliefs are among the strongest predictors of human motivation for behaviors (Bandura, 1993). It is known that belief in teaching efficacy is a key factor in teacher development and has a strong influence on teachers' practices, student achievement, and implementation of new teaching strategies (Allinder, 1995; Klassen & Tze, 2014; Moore & Esselman, 1992; Putman, 2012; Swackhamer et al., 2009; Tschannen-Moran, Woolfork Hoy & Hoy, 1998; Watson, 1991; Velthuis, Fiser, & Pieters, 2014). Teachers with high teaching efficacy beliefs create classroom environments in which students have the opportunity to be more successful, teachers with low teaching efficacy beliefs are not very dependent on teaching, avoid teaching-centered problems and are more likely to be exhausted (Bandura, 1993; Czerniak, 1990; Guskey, 1985; Swackhamer et al., 2009).

Mathematics self-efficacy is a person's perceived ability in the context of mathematics (Pajares, 1996). Hackett and Betz (1989) defined it as a self-assessment of one's self-confidence to perform a specific math task or solve a math problem. Mathematics self-efficacy is different from a person's attitude towards mathematics, self-concept, or belief in mathematics. Mathematics self-efficacy is specific to a certain area and the person who says “I can solve algebraic equations” shows a high sense of self-efficacy in this area. The expression “I am good at mathematics” is related to the self-concept towards mathematics in general, that is, to what extent a person is confident of himself without performing well in mathematics (Pehlivan & Köseoğlu, 2011).

Teachers have mathematics self-efficacy at various levels such as mathematics content knowledge, teacher preparation, student achievement results, individual’s personal efficacy level and their own mastery level (Bandura, 1986; Gresham, 2008). Mathematics self-efficacy is an important factor in mathematics education, and the level of mathematics self-efficacy a teacher brings to the classroom will also determine the quality of mathematics instruction students receive (Berger & Karabenick, 2011; Rosário, Lourenco, Paiva, Rodrigues, Valle, & Tuero-Herrero, 2012). According to Swars (2005), mathematics self-efficacy is an important predictor of mathematics teaching strategies, and teachers with high mathematics self-efficacy are more effective mathematics teachers than teachers with lower efficacy beliefs.

Mathematics teaching self-efficacy can be explained as teachers’ personal beliefs about their own efficacy beliefs in mathematics teaching and an individual’s personal perception of their ability to teach mathematics to others (Enochs, Smith, & Huinker, 2000). Teaching mathematics self-efficacy is defined not as an attitude of teachers towards teaching mathematics, but as a belief that the teacher can help their students learn mathematics (Bates, Latham, & Kim, 2011; Swars, Hart, Smith, Smith, & Tolar 2007). Teachers who have higher mathematics teaching self-efficacy tend to rely more on trying different strategies and teaching mathematics skills during teaching (Bates, Kim, & Latham, 2011). Mathematics ability alone is not enough for an individual to become an effective teacher, and pre-existing beliefs about learning and teaching, as well as mathematics ability, play an important role in planning and implementing mathematics lessons for prospective teachers and those new to the teaching profession (Benbow, 1995).

In studies on teachers’ mathematics teaching efficacy beliefs, it has been revealed that despite the numerous professional development programs and guidelines prepared on mathematics teaching, teachers consider themselves inadequate in mathematics teaching (Marrongelle, Sztajn & Smith, 2013; Swars, Hart, Smith, Smith, & Tolar, 2007). In addition, Borko and Whitcomb (2008) stated that the negative views and beliefs of primary school teachers who work in the first level of education indirectly affect the quality of teaching and student achievement. It has also been observed in studies that beliefs have a strong effect on students’ achievement in planning, implementing and decision-making processes of teachers’ teaching (Fives & Buehl, 2016; Kitsantas, Ware & Cheema, 2010; Klassen & Tze, 2014; Mansour, 2009; Peters-Burton & Frazier, 2012; Schoenfeld, 2015; Skott, 2015; Thomson & Gregory, 2013; Tschannen-Moran & Woolfolk Hoy, 2001).

Studies on mathematics teaching efficacy beliefs (Charalambous, Philippou ve Kyriakides, 2008; Richardson ve Liang, 2008; Swars et al., 2007; Utley, Moseley & Bryant, 2005) show that teachers with high levels of proficiency are more likely to apply new teaching and adopt innovations and set higher goals for themselves and their students

(Schunk, Pintrich, & Meece, 2008). Therefore, the importance of teachers' efficacy beliefs in influencing teaching goals and classroom practices draws attention (Velthuis, Fisser, & Pieters, 2014).

Considering the importance of understanding mathematics teachers' beliefs about their efficacy beliefs in mathematics teaching; This study is thought to make a significant contribution to the field in determining the efficacy beliefs of secondary school mathematics teachers in teaching mathematics. For this purpose, the following questions were sought in the study:

1. What is the level of mathematics teachers' mathematics teaching efficacy beliefs?
2. Is there a significant difference on mathematics teachers' mathematics teaching efficacy beliefs according to some demographic variables such as gender, school type, and professional seniority?

2.Method

2.1. Research Design

In this study, a relational screening model, one of the quantitative research methods, was used to examine the efficacy beliefs of secondary school mathematics teachers in teaching mathematics in terms of some variables. Relational scanning is defined as an approach that aims to determine the existence of change between two or more variables (Karasar, 2003).

2.2. Study Population and Sample

The universe of our research consists of teachers working in public and private secondary schools affiliated to the Ministry of National Education in Turkey. The sample of the study consists of 165 mathematics teachers selected by stratified sampling method at 95% confidence level. Stratified sampling is a sampling method that aims to identify subgroups in the universe and represent them with their ratio within the size of the universe (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2010). Demographic characteristics of the participants are summarized in Table 1.

Table 1: Demographic Characteristics of Mathematics Teachers

Variable		%	N
Gender	Male	58.2	96
	Female	41.8	69
School Type	Public Secondary School	67.9	112
	Private Secondary School	32.1	53
Professional Seniority (years)	0-5	17.0	28
	6-10	17.6	29
	11-15	18.8	31
	16-20	20.0	33
	21 and +	26.0	44

According to the information given in Table 1, approximately 58.2% of the teachers are male and 41.8% are female. 67.9% of the teachers work in public schools and 32.1% in private schools and the category in which teachers have the highest rate in terms of time spent in the profession seniority is between 21 and + years (26.0%) and this is between 16-20 years (20%) is following.

2.3. Data Collection Tools

Mathematics Teaching Efficacy Belief Scale: The scale that was used in the study was developed by Enochs, Smith, and Huinker (2000) and was adapted into Turkish by Takunyacı and Aydın (2013). The scale was designed in a 5-point Likert type (from "Strongly Disagree" to "Strongly Agree"). The scale consisted of 21 items and two factors; first factor is called Personal Mathematics Teaching Efficacy (PMTE) consisting 13 items and second factor is called Mathematics Teaching Outcome Expectancy (MTOE) consisting 8 items. The highest score that can be obtained from this scale is 105, and the lowest score is 21. High scores indicate high efficacy beliefs in teaching mathematics.

2.4. Data Analysis

The descriptive statistics (arithmetic mean and standard deviation etc.) of the answers given by mathematics teachers regarding the items in the *Mathematics Teaching Efficacy Belief Scale* were calculated in order to reveal their self-efficacy in teaching mathematics. The normality values of the data obtained from the scale were tested with Kolmogorov-Smirnov and Kurtosis-Skewness values. It is accepted by Tabachnik and Fidell (2013) that if the skewness and kurtosis values are between -1.5 or +1.5, the distribution shows a normal distribution. In our study, parametric tests (t-test for independent groups) were used in the analysis of the data, since the scale data provided the assumptions of normality according to gender and school type (kurtosis between -.367 and .501; skewness values between -.211 and .712). Nonparametric tests (Kruskall Wallis, Mann Whitney U) were used in the analysis of the data, since the scale data did not provide normality assumptions in the distribution of teachers according to their professional seniority (kurtosis between -3.341 and 2.101; skewness values between -2.523 and 1.723).

3. Results

In this section, the data obtained in the research are presented and interpreted according to the sub-problems.

First sub-problem:
What is the level of mathematics teachers' mathematics teaching efficacy beliefs?
The average of the total scores obtained from the Mathematics Teaching Efficacy Belief scale are given in Table 2.

Table 2: Descriptive statistics for scores

	N	$\overline{X}$	SD	$\overline{X}_a$
Personal Mathematics Teaching Efficacy	165	43.30	4.12	3.72
Mathematics Teaching Outcome Expectancy	165	20.12	5.88	3.32
Total	165	63.42	3.67	3.59

Average of the total scores ($\overline{X}$), Standard deviations (sd), and Arithmetic means ($\overline{X}_a$)

The average of the total scores obtained from the Mathematics Teaching Proficiency Belief Scale was $\overline{X}$= 63.42. According to this value, mathematics teachers' beliefs about mathematics teaching are at a medium level. When the arithmetic average of the scores obtained from the sub-factors of the scale ($\overline{X}_a$= average score from the relevant sub-factor / number of items) are examined, it is seen that the beliefs of mathematics teachers about personal mathematics teaching ($\overline{X}_a$= 3.72) are higher than their beliefs about the result expectation in mathematics teaching ($\overline{X}_a$= 3.32).

Second sub-problem:
Is there a significant difference on mathematics teachers' mathematics teaching efficacy beliefs according to the variables of gender, school type, and professional seniority?

- Independent t-Test was conducted for independent groups to determine whether there is a significant difference on the average of the total scores obtained from scale according to the gender variable. The results of these analyzes are given in Table 3.

Table 3: Independent t-Test results for gender

	Gender	N	$\overline{X}$	Sd	t	p
Personal Mathematics Teaching Efficacy	Male	96	45.19	3.44	4.245	.043*
	Female	69	36.64	3.12		
Mathematics Teaching Outcome Expectancy	Male	96	19.93	4.35	3.657	.038*
	Female	69	25.08	5.76		
Total	Male	96	65.12	4.45	1.012	.405
	Female	69	61.72	3.76		

*p < .05

It was determined that the total scores obtained from the replies given by the female and male teachers regarding the Mathematics Teaching Efficacy Belief Scale did not differ statistically according to the gender (t = 1.012, p> .05). In Table 3, the average of male teachers' mathematics teaching efficacy belief scores was found to be $\overline{X}$ = 65.12, while it was found to be $\overline{X}$ = 61.72 for female teachers. Here, although the scores of male teachers in mathematics teaching efficacy belief were found to be high, it was found that this was not statistically significant. According to this finding, it can be said that teachers' mathematics teaching efficacy beliefs do not change according to the teachers' gender.

It was observed that there was a significant increase in the efficacy scores of male teachers (t = 4.245, p <.05) in the factor of "Personal Mathematics Teaching Efficacy" which is the sub-factor of the scale. According to this finding, it was found that male teachers' *personal mathematics teaching efficacy beliefs* ($\overline{X}$ = 45.19) were significantly higher than female teachers' beliefs ($\overline{X}$ = 36.64). As a result, it can be said that teachers' *personal mathematics teaching efficacy beliefs* vary according to teachers' gender.

We can see in Table 3, a significant increase was found in the efficacy scores of female teachers (t = 3.657, p <.05) in the factor of "Mathematics Teaching Outcome Expectation" which is the sub-factor of the scale. According to this finding, it was found that female teachers' beliefs about *outcome expectations in mathematics* teaching ($\overline{X}$ = 25.08) were significantly higher than that of male teachers ($\overline{X}$ = 19.93). As a result, it can be said that teachers' beliefs about *outcome expectations in mathematics teaching* vary according to teachers' gender.

- Independent t-Test was conducted for independent groups to determine whether there is a significant difference on the average of the total scores obtained from scale according to the school type variable. The results of these analyzes are given in Table 4.

Table 4: Independent t-Test results for school type

	School Type	N	$\overline{X}$	Sd	t	p
Personal Mathematics Teaching Efficacy	Public high school	112	46.28	3.71	1.721	.453
	Private high school	53	42.65	3.02		
Mathematics Teaching Outcome	Public high school	112	16.20	3.55	4.512	.012*
	Private high	53	21.71	3.82		

Expectancy	school					
Total	Public high school	112	62.48	3.55	1.430	.412
	Private high school	53	64.36	2.82		

*p < .05

It was determined that the total scores obtained from the answers given by the teachers regarding the Mathematics Teaching Efficacy Belief Scale did not differ statistically according to the public ($\overline{X}$ = 62.48) and private high schools ($\overline{X}$ = 64.36) in which the teachers worked (t = 1.430, p> .05). According to this finding, it can be said that the mathematics teaching efficacy beliefs of the mathematics teachers working in public and private high schools are similar.

It was found that there was no statistically significant difference between private ($\overline{X}$ = 42.65) and public ($\overline{X}$ = 46.28) high schools teachers' scores obtained from the factor of "Personal Mathematics Teaching Competence" (t = 1.721, p> .05). According to this finding, it can be said that public and private high school teachers' personal mathematics teaching efficacy beliefs are similar.

We can see in Table 4, a significant increase was found in the efficacy scores of teachers working in private high schools (t = 4.512, p <.05) in the factor of "Mathematics Teaching Outcome Expectation." According to this finding, it was found that private high school teachers' beliefs about *outcome expectations in mathematics* teaching ($\overline{X}$ = 21.71) were significantly higher than that of public high school teachers ($\overline{X}$ = 16.20). As a result, it can be said that teachers' beliefs about outcome expectations in mathematics teaching vary according to the variable of school type.

- Kruskal Wallis H Test was conducted for independent groups to determine whether there is a significant difference on the average of the total scores obtained from scale according to the professional seniority variable. The results of these analyzes are given in Table 5.

Table 5: Kruskal Wallis H Test results for professional seniority

	Professional Seniority (year)	N	Mean rank	X^2	p
Personal Mathematics Teaching Efficacy	0-5	28	33.42	6.533	.032*
	6-10	29	35.48		
	11-15	31	39.71		
	16 -20	33	38.66		
	21 and +	44	37.55		
Mathematics Teaching Outcome Expectancy	0-5	28	28.02	7.812	.422
	6-10	29	29.75		
	11-15	31	28.84		
	16 -20	33	28.66		
	21 and +	44	23.65		
Total	0-5	28	61.44	9.186	.401
	6-10	29	65.23		
	11-15	31	68.55		
	16 -20	33	67.32		
	21 and +	44	61.20		

*p < .05

The findings in Table 5 show that there is no significant difference between the total scores of mathematics teachers obtained from the whole scale according to their professional seniority and the total scores they got from the sub-

factor of "Mathematics Teaching Results Expectation." This finding revealed that teachers have similar beliefs ($p > .05$).

When the scores obtained by mathematics teachers from the sub-factor of "Personal Mathematics Teaching Efficacy" were examined, it was found that there was a statistically significant difference between the scores of the teachers according to their professional seniority. According to the results of the Mann-Whitney U test conducted to find out which professional seniority this significant difference is; it was found that teachers whose professional seniority was 11 years and above had significantly higher personal mathematics teaching efficacy beliefs than teachers with professional seniority of 0-5 years.

4. Discussion and Conclusion

Scarpello (2010) stated that teachers at all levels of education have many different backgrounds, especially primary school teachers' beliefs about teaching mathematics and their ability to successfully guide students in teaching mathematics. The mathematics education students receive in primary school forms the basis of their future mathematics-related academic careers, which shows the importance of an efficient mathematics education (Jordan, Glutting, & Ramineni, 2010).

Studies have shown that the better a teacher understands mathematics, the higher their self-efficacy beliefs in teaching mathematics are (Enochs, Smith, & Huinker, 2000; Newton, Leonard, Evans & Eastburn, 2012). In addition, the expectation that teaching will result in learning (Enochs, Smith & Huinker, 2000) and teaching competence directly affects student performance in mathematics was explained by teachers' mathematics teaching efficacy beliefs (Bandura, 2012; Bates, Kim & Latham, 2011; Bong & Clark, 1999; Vadahi & Lesha, 2015; Varghese, Garwood, Bratsch-Hines, & Vernon-Feagans, 2016).

Considering the importance of determining mathematics teachers' beliefs about their efficacy in mathematics teaching, it is thought that this study will make a significant contribution to the field. In the first finding of our study, it was found that mathematics teachers' beliefs about mathematics teaching were medium level, and mathematics teachers' *beliefs about personal mathematics teaching* were higher than their *beliefs about outcome expectancy in mathematics teaching*. In the study performed by Dede (2008) on thirty mathematics teachers, it was found that self-efficacy beliefs towards the teaching of mathematics teachers were at a high level.

In the second finding of our study, it was found that teachers' mathematics teaching efficacy beliefs did not change according to the teachers' gender, in other words, female and male teachers' mathematics teaching efficacy beliefs were similar. Hacıömeroğlu and Şahin-Taşkın (2010) showed similarities with the findings of the study they conducted with prospective classroom teachers, and it was stated that female and male teacher candidates' efficacy beliefs for teaching mathematics did not differ. It was found that male teachers' personal mathematics teaching efficacy beliefs were significantly higher than female teachers. However, Hacıömeroğlu and Şahin-Taşkın (2010) stated that female teacher candidates' beliefs that they could perform more effective practices in the process of teaching mathematics in the classroom were significantly higher and sufficient than male candidates. This situation ensures that female teacher candidates have high beliefs about outcome expectations in teaching (Akbaş & Çelikkaleli, 2006). For this reason, in our study, it was found that female teachers' beliefs about outcome expectations in mathematics teaching were significantly higher than that of male teachers.

In the third finding of our study, it can be said that mathematics teachers', working in public and private high schools, mathematics teaching efficacy beliefs, and *personal mathematics teaching efficacy beliefs* are similar. However, it was found that mathematics teachers' *beliefs about the outcome expectations in mathematics teaching* working in private high schools were significantly higher than mathematics teachers' working in public high schools.

In the last finding of our study, when mathematics teachers' self-efficacy beliefs about teaching mathematics according to their professional seniority were examined; It was found that teachers' beliefs about mathematics

teaching efficacy beliefs and mathematics teaching outcome expectations did not change according to the seniority variable, in other words, teachers' mathematics teaching efficacy beliefs of different professional seniority years were found to be similar. This finding does not coincide with the outcome expectancy theory expressed as Bandura's (1997) belief that a teacher's outcome expectancy in teaching will improve with his experience. In addition, personality differences between teachers with different years of experience were explained by Ryan (1981), Newman (1979), and Burden (1979) and stated that teachers with similar experiences have common teaching beliefs and attitudes. However, in our study, it was found that mathematics teachers' personal mathematics teaching efficacy beliefs with professional seniority of 11 years or more were significantly higher than teachers with professional seniority of 0-5 years. Similarly, Ginns and Watters (1994) stated in their study that the self-efficacy beliefs of teachers who are new to the profession are low and that there should be cooperation between teacher trainers and experienced teachers in order to develop these beliefs. Stuart (2017) stated that as the experience of teachers increased, their teaching efficacy levels in mathematics also improved as a result of his doctoral study. In addition, as teachers gain more experience in teaching, they improve their teaching skills and math performance (Huang, Li, Kulm, & Willson, 2014).

5. Suggestions

Vadahi and Lesha (2015) point out that it can be difficult to change teachers' beliefs about their teaching without appropriate support and development programs. In order to ensure those prospective teachers, who will become future mathematics teachers, develop their beliefs about their personal and teaching efficacy, they should gain more experience in teaching mathematics lessons and contribute to their development by observing teachers who can set an example for them.

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